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THE UNITED STATES ARMY LOGISTICS CENTER

HISTORICAL SUMMARY

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1 OCTOBER 1976 TO 30 SEPTEMBER 1978.

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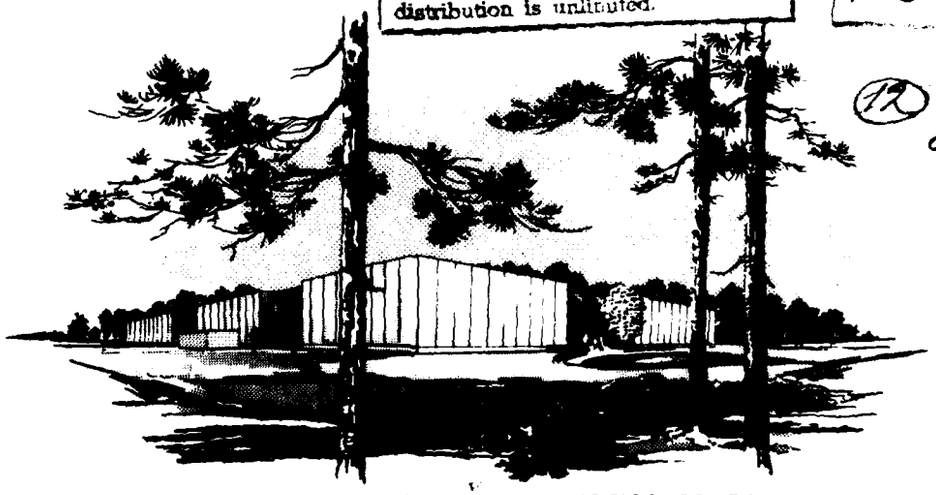

UNITED STATES ARMY LOGISTICS CENTER
FORT LEE, VIRGINIA 23801

HISTORICAL SUMMARY

(RCS-HIS-6 (R2))

US ARMY TRAINING AND DOCTRINE COMMAND

US ARMY LOGISTICS CENTER

FORT LEE, VIRGINIA 23801

1 OCTOBER 1976 to 30 SEPTEMBER 1978

DEPARTMENT OF THE ARMY
UNITED STATES ARMY LOGISTICS CENTER
FORT LEE, VIRGINIA 23801

ATCL-DA

10 January 1980

SUBJECT: LOGC Historical Summary, 1 October 1976--30 September 1978 (RCS-HIS-6 (R2))

SEE DISTRIBUTION

The LOGC historical Summary, 1 October 1976--30 September 1978, prepared in accordance with AR 870-5, Historical Activities: Military History--Responsibilities, Policies, and Procedures, is forwarded for information and retention.

FOR THE COMMANDER:

1 Incl
as

GAITHER C. BRAY
Colonel, GS
Chief of Staff

DISTRIBUTION:
See last page of inclosure

FOREWORD

This volume is the third of the US Army Logistics Center's Annual Historical Summaries. A look at the Table of Contents will indicate its scope and coverage. While the Summary contains information on many of the Center's most important projects, it does not include all of these undertakings. That would be an impossible task, given the nature and length of the summary. The decision to include some and exclude others was based on Directorate input and coordination and was not an arbitrary decision on the part of the LOGC Historian.

The history has been based in large part on the annual and semi-annual directorate feeder reports, the Commanders Annual Report to TRADOC, selected correspondence, trip reports, and Command Quarterly Reviews and Analyses. Prepared in compliance with AR 870-5, this history will be used by TRADOC as a source for their annual historical review. It will also be used by the US Army Center of Military History as a guide for more comprehensive histories. Within the LOGC, it will serve as a documented record of events and their courses and as a briefing and orientation document.

The history was typed by the LOGC Word Processing Center.

ROBERT P. SMITH
Command Historian

Major General Homer D. Smith, Jr.
Commanding General
United States Army Logistics Center
28 July 1977 - Present

Major General Erwin M. Graham, Jr.
Commanding General
United States Army Logistics Center
1 July 1973 - 28 July 1977

Brigadier General Kenneth A. Jolemore
Deputy Commanding General
United States Army Logistics Center
15 June 1978 - Present

Brigadier General Ernest A. Vuley, Jr.
Deputy Commanding General
United States Army Logsitics Center
1 July 1975 - 2 September 1977

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CHAPTER 1

MISSION AND ORGANIZATION

Background

This period (1 October 1976 - 30 September 1978) marked completion of 5 years of Logistics Center (LOGC) activity as one of the Army's primary logistics innovators. Coinciding with this noteworthy event was the Center's first change of command. On 28 July 1977, Maj Gen Erwin M. Graham, Jr., retired from the Army and that same day Maj Gen Homer D. Smith, Jr. assumed command.

Inevitably, a change of command brings new ideas and priorities--in aims, emphasis, style, and tone. Yet continuities outweighed the changes. The modernizing currents in logistical support that began in March 1973 were long-term efforts which the new commander had earlier anticipated.

Upon assumption of command of the Provisional Logistics Center, General Graham accomplished the organization of the LOGC. The STEADFAST project initiated by the Training and Doctrine Command (TRADOC) defined in very general terms the operational concept for a logistical integrating center. General Graham provided the necessary details to that operational concept which from the earliest stages effectively integrated the activities of the four associated schools in accomplishing the logistic roles in supply, maintenance, transportation, and services.

He organized the LOGC into directorates and by direct liaison with the Department of the Army (DA) Deputy Chief of Staff for Personnel, selected the key members of the LOGC staff. He initiated the planning for the LOGC program and brought the logistical system design function into the LOGC. That function had formerly been with the Logistics Doctrine Systems Readiness Agency and other elements of the DA Deputy Chief of Staff for Logistics (DCSLOG). He also merged the Maintenance Directorate with the Materiel Directorate and established that organization along commodity lines to effectively interface with the Army Materiel Command. During his incumbency, General Graham directed the first of the TRADOC scenario evaluations. That concerned the XVIII Airborne Corps D-Package contingency plan. Under his leadership, the LOGC established a close working relationship with the XVIII Airborne Corps, the 82d Airborne Division, and the 1st COSCOM. The D-Package analysis provided the basis for the meeting at Fort Leavenworth in July 1973 which initiated what was then called the Living Model. The title of that project was later changed to Scenario Oriented Recurring Evaluation System (SCORES). Elements of the D-Package analysis to include the threat and methodology were used to a significant extent in initiating the SCORES Middle East evaluation.

After General Graham's arrival in 1973, he directed his efforts toward furthering logistics developments. His "emerging logistics system" concept outlined a plan for providing responsive combat service support to the Army in the field. Under his leadership, the LOGC became the Army's "center of logistical expertise."[1] He also initiated a major study which had as its purpose improving repair parts supply for the Army. In this project, he directed the integration of many efforts which had been accomplished piecemeal throughout the Army establishment.

Another of General Graham's most significant accomplishments during this period concerned the manner in which he enunciated the role of the LOGC throughout the Army community. The concept of an integrating center was unique since he did not have direct command authority over the associated schools. It is a tribute to his leadership that in the words of the TRADOC Commander, General William E. DePuy, "the LOGC began an effective program before any other element within the Training and Doctrine Command."[2] Along these lines, General Graham provided guidance for establishing the Logistics Center Advisory Board (LOGCAB). The first meeting of the LOGCAB was held 12-13 November 1973. The DA, DCSLOG at that time, Lt Gen Fred Kornett, Jr., said that LOGCAB I had in attendance more of the Army's top logisticians than any other meeting which preceded it. He further stated that he was particularly impressed with the impetus that General Graham had provided in the accomplishment of the new Center's Mission.[3]

In his first talk to his staff in May 1977, General Smith--who was TRADOC's Deputy Chief of Staff for Logistics--announced that he would make very few changes to the LOGC's standard operating procedure. He emphasized the importance of action officers, his accessibility to directors and action officers, and the need for coordination and cooperation within and without the LOGC, especially with TRADOC and DA. Major changes would come, Smith commented, but their arrival would be characterized by study and evaluation. These changes would be reflected in reorganization, major programs and initiatives, the elimination of other projects, and the expansion of the LOGC mission and function.[4] Taken together, the initiatives of the 1977-1978 period, constituted in retrospect the ground work of a fundamental intensification and solidification of logistics concepts and doctrine. These major currents continued a forward progress in the period covered by this history.

General Graham's direction of the program continued until his retirement on 28 July 1977. It is not the purpose of these pages to write a panegyric to a commander whose accomplishments were viewed by many as extraordinary, but one judgment at least must be recorded. Speaking at

ceremonies at Fort Lee on 28 July, Lt Gen Frank A. Camm, TRADOC Deputy Commander, in awarding General Graham the Distinguished Service Cross, noted that,

> "Under General Graham's strong and devoted leadership the Logistics Center has developed, implemented, and extended many new and innovative logistics concepts and systems. . . . Major General Graham's influence in the development of Army Logistics, particularly his organizational and conceptual contributions, coupled with his overall leadership during the last four years, have gained for the Logistics Center the respect of the entire Army, and reflects the highest credit upon him and the US Army. . . . Under his dynamic leadership, the LOGC very quickly began making lasting contributions to the Logistics system. Although the following orders bring to a close his military career, the Army logistics system will feel his presence for years to come."[3]

Mission

"The LOGC was viewed, upon its activation, as the institution which would provide the Army with what it had been looking for since the end of World War II: an organization in one location which would integrate the many logistical functions the Army performs and improve the general caliber and performance of Army logistics personnel. Its mission, as established shortly after its founding, was five-fold.

1. Develop logistics concepts, doctrine, organizations, systems, and materiel concepts and requirements for the Army.

2. Insure the proper and expeditious incorporation of approved logistic concepts and doctrine in service school programs of instruction.

3. Conduct logistics exercises and provide training assistance to active Army and Reserve component units.

4. Serve as a principal advisor to the Department of the Army, the Training and Doctrine Command, and the Materiel Development and Readiness Command (the successor to AMC) on logistic matters, including reviews and recommendations on the career development of logistics personnel.

5. Provide a consulting service on Army logistics to CONUS and overseas commands."

"Prior to the establishment of the LOGC, work on concepts doctrine, literature, personnel training, systems design, and other logistical issues was never adequately coordinated. Then, under the STEADFAST PLAN, the Army combined in the LOGC, many functions of logistics: the development of concepts and doctrine, the design of management information systems, the integrated logistics support of materiel characteristics, the organization of combat service support units, logistical training, and logistical testing and evaluation. The new Center became the focal point for all levels of command for coordinating, integrating, and maintaining the consistency of logistics doctrine and systems; and it exercised functional management authority over schools with logistics doctrine and systems responsibilities. Working with the schools and with the US Army Combined Arms Center (USACAC) and the US Army Administration Center (ADMINCEN), the Logistics Center developed the combat service support system to support the Army's tactical elements."[6]

"The LOGC was established to serve as the focal point in logistics doctrine development, systems development, and the integration of training

of logistics doctrine and systems for the Army in the field. For doctrine, this means that the LOGC is the single Army "doer" for unifying logistics doctrine development in that it evaluates, coordinates, and consolidates all Army logistical doctrine. In the area of materiel requirements, the LOGC coordinates and evaluates the logistics annex to materiel requirements documents and establishes the requirements for supportability in conjunction with developing agencies. Furthermore, the Center is the primary repository of logistics knowledge. In the area of systems development, the LOGC is responsible for developing logistics operations, reporting, and management information systems for the Army in the field.

"The LOGC is designed to think out, support, and develop the concepts for the Army in the field. Every combat officer must be concerned with maximizing the firepower and mobility of his troops. Every combat unit must be armed so as to facilitate the performance of its particular mission, both in offense and defense. In order to increase mobility, the load of the foot soldier must be reduced to the absolute necessities, using lightweight but serviceable materials. Supply systems must be organized to bring emergency and replacement equipment to the battlefield. Medical evacuation must be provided and a communications network established. Combat vehicles must have the necessary tactical mobility to perform their designated function. Rear area support units must be organized to carry out supply, repair, and replacement operations as efficiently as possible. All this must be done in order to free the combat commander from logistical concerns and allow him to concentrate on the battlefield.

"And, at a time in which fiscal constraints are imposed on military development and national security depends on a small, highly professional, Army, logistical developments must emphasize quality over quantity. The LOGC has the challenging responsibility of responding to the Army's combat needs by carefully developing and testing new equipment, systems, and organizations.

"In the last 30 years, profound changes have occurred in the Army's weapons system. Vastly increased firepower and mobility cause devastating destruction of life and property. Under such circumstances, our combat effectiveness must be vigorously developed and proper logistical support is a prerequisite for effective combat power. New technological and research developments must be promptly evaluated to learn their battlefield applications and combat organizations must be designed to maximize the effectivenesss of the weapons system. As the institution which attempts to insure that logistics developments meet the combat requirements of the United States Army, the LOGC has come to play a crucial role in building our nation's defense."[7]

Organization

Maj Gen Graham, Commanding General since LOGC inception on 1 July 1973, exercised command through 28 July 1977, retiring on that date in ceremonies at Fort Lee attended by the TRADOC Deputy Commander, Lt Gen Camm. Succeeding General Graham was Maj Gen Smith, who had just left TRADOC where he served as Deputy Chief of Staff for Logistics. General Smith assumed command of the LOGC on 28 July 1977. Two months later, on 2 September 1977, the LOGC Deputy Commander, Brigadier General Ernest A. Vuley, Jr., departed the LOGC for the position of Director of Materiel Management, Army Development and Readiness Command, in Washington, DC. He was succeeded on 15 June 1978 by Brigadier General Kenneth A. Jolemore. Colonel R. W. Fisher continued on as Chief of Staff until 30 June 1978, when he retired from active service. Colonel Gaither C. Bray then assumed that position.[8]

Nine directors managed the major elements of the Center--Operations and Administration, Concepts and Doctrine, Management Information Systems, Operations Analysis, Materiel Systems, Force Structure and Test, Training and Education, Unit Training, and Organization. In addition to the major directorates, the command group included at some time during this period a Deputy Chief of Staff for Operations, an Administrative Support Office, and Scientific and Technical Advisors. Figure 1 provides a list of incumbents of key LOGC positions.

The LOGC Commander operated under the supervision of the Commander, TRADOC, who issued directives, policies, planning, and program guidance, approved programs, priorities, resource allocations, and other matters of command direction. LOGC was authorized direct communications with other major Army commands and with heads of DA staff and field operating agencies on matters of mutual interest.

The LOGC Commander was assigned two principal TRADOC missions--the major Army mission of retail and user level field logistics and the mission of coordinating its four associated schools: Quartermaster, Ordnance and Chemical, Transportation, and Missiles and Munitions. (See figure 2)

The Commander directed, correlated, and integrated logistical concepts and developments for TRADOC. He developed training programs and materials and monitored the training of Army personnel in the field and in the schools. He developed training materials and provided support for both individual and collective unit training. (He formulated and changed logistical doctrine, developed needed materiel and logistics training for the Army, and provided other logistical support for training.) As one of the Army's principal logistics innovators, he helped guide, coordinate, and integrate the total logistics developments effort of TRADOC and DA.

Position	Name	Date of assignment/departure
Commanding General	MG E.M. Graham, Jr.	until 28 July 1977
	MG H.D. Smith, Jr.	28 July 1977
DCG	BG E.A. Vuley, Jr	until 2 September 1977
	BG K.A. Jolemore	15 June 1978
Chief of Staff	COL J.H. Carroll, Jr	until 1 September 1977
	COL R.W. Fisher	until 30 June 1978
	COL G.C. Bray	1 July 1978
DCSOPS	COL I. Prince	until 10 January 1977
	LTC R.C. Gervasini	until 31 July 1977
Scientific Advisor	Ellwood C. Hurford	November 1968
Technical Advisor	Frederick H. Terry	June 1973
Logistics Training Board Unit Training Directorate	COL R.G. Rennebaum	1 August 1974
Materiel Systems Directorate	COL R.W. Fisher	until 31 August 1977
	COL I.R. Prince	until 17 February 1978
	COL S. Millimet	17 February 1978
System Design Directorate	COL W.S. Bice	until 5 August 1977
	COL D.C. Poorman	5 August 1977
Operations and Administration Directorate	COL D.G. Smaw III	until 31 August 1978
	COL P.C. Hains	6 September 1978
Evaluation and Test Directorate Force, Structure and Test Directorate	COL G.T. Morris, Jr	until 30 June 1977
	COL J.O. Hayes	1 July 1977
Concepts and Doctrine Directorate	COL D.R. Werner	until 4 June 1978
	COL H.W. Lacquement	5 June 1978
Training and Education Directorate	COL C.W. Hance	until 15 July 1977
	COL J.J. Koloski	19 July 1977
Operations Analysis Directorate	COL R. Johnson	until 5 August 1977
	COL E.L. Phillips	5 August 1977
Organization Directorate	COL C.A. Woods	until September 1977
	COL L.E. Gaither	until 30 November 1977
	LTC J.M. Pierce	until 31 August 1978
	LTC W.L. Mazyck	1 September 1978
Command Sergeant Major	CSM J.H. Nixon	31 March 1978

Figure 1. Key Personnel - LOGC FY 77--78

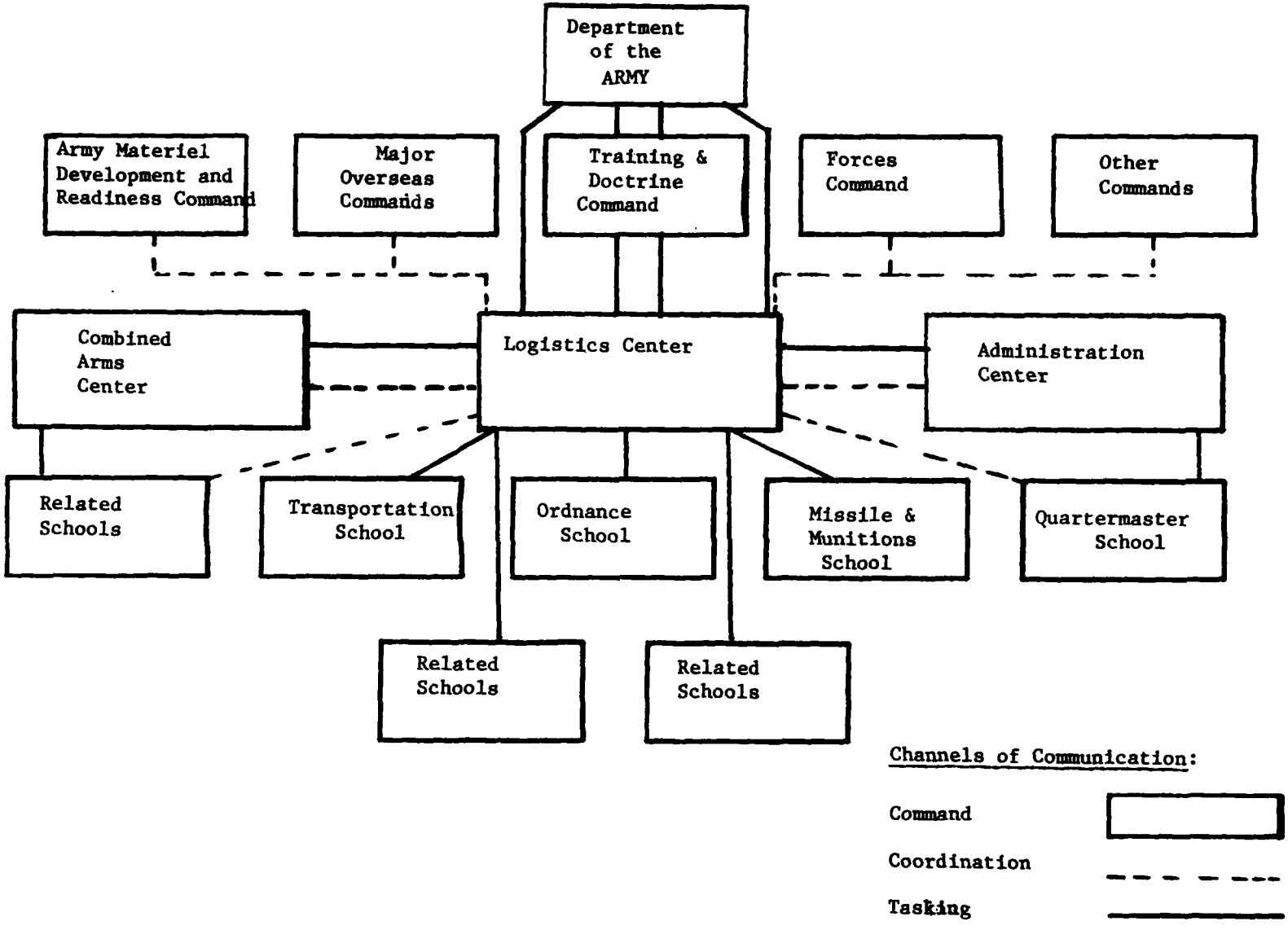

Figure 2 Evolution of the US Army Logistics Center

Internal LOGC Organization

The Director, Concepts and Doctrine exercised responsibility for creating new and improved concepts and doctrine for logistics procedures, organizations, and support systems. These were largely confined to the current and near future timeframes. The director was involved with solving problems resulting from voids and deficiencies in current systems. Three additional director functions included the training literature program, overall design of combat service support forces, and the development of logistics operation plans supporting the combat portion of Training and Doctrine Command standard scenarios.

The Director, Materiel Systems by representing the combat developer and the user, managed and provided staff supervision for the development of materiel for the Army (except medical materiel). His primary functions included reviewing the reliability, availability, and maintainability (RAM) characteristics that equipment must have to fulfill the needs of the user in the field, the review of requirements documents for all logistics materiel items, and the provision of integrated logistics support for all Army materiel items through their life cycle.

The Director, Systems Design developed and coordinated the functional plans, design, installation, maintenance, and customer assistance of retail logistics operating/management information systems and TRADOC/Forces Command (FORSCOM) unique requirements necessitating over three man-years of effort for supply, maintenance, and transportation organizations. The director also insured the compatibility of these systems with the financial and wholesale logistics systems developed by the US Army Finance and Accounting Center, US Army Materiel Development and Readiness Command (DARCOM), Defense Logistics Agency - formerly Defense Supply Agency, and the General Services Administration as well as other DOD/DA logistics policies, objectives, and programs. This director worked closely with the US Army Computer Systems Command Support Group (USACSCSG), collocated with the LOGC.

The Director, Unit Training integrated, coordinated, and managed the logistic's community efforts as they related to improving training assistance to logistics units. This included management of the Army Training and Evaluation Program (ARTEP) and the Training Extension Course (TEC) program. The primary training assistance effort focused on early deploying logistics units, with exportable training as the principal mode. This directorate served as the focal point for planning, preparing, and conducting the annual Joint Chiefs of Staff (JCS) programmed, Department of the Army sponsored command post exercise (CPX) known as LOGEX, which provided a realistic mission training vehicle in a simulated wartime environment for commander and key staff personnel of combat

support and combat service support units, both active and reserve. The Navy, Air Force, Marine Corps, and NATO elements also participated in LOGEX. The directorate provided field organizations with individual unit CPX training packets.

The Director, Operations Analysis provided a technical research and evaluation capability in support of Army logistics activities through: (1) applications of operations research/systems analyses, cost/economic analyses, analytical models, and computer simulations; (2) development and management of logistics planning factors; (3) design and use of automated logistics data; and (4) operations of a computer center.

The Director, Training and Education monitored logistics training and education at all Army schools and centers. He evaluated the courses of instruction and training requirements and he assured that programs of instruction incorporated current logistics doctrine. The development and improvement of career management systems and programs for professional military and civilian logistics personnel fell under his control. Additionally, he planned for the orderly development of instruction and training materials to support new materiel and logistics systems.

The Director, Organization developed and maintained viable logistics tables of organization and equipment (TOE) for the Army combat service support units. As such, he investigated the adequacy of coordination within logistic units. He also examined the sufficiency of Manpower Authorization Criteria (MACRIT), which established the number and type of training personnel needed; Qualitative and Quantitative Personnel Requirements Information (QQPRI), used to establish and revise Military Occupational Specialities (MOS) which impact on training needs; and the Basis of Issue Plans (BOIP) which determined initial distribution of new items of equipment.

The Director, Force Structure and Test joined in numerous field experiments and operational tests to evaluate logistics concepts, support new equipment, and new logistics management systems. The director participated in the Scenario Oriented Recurring Evaluation System to evaluate logistical adequacy and soundness (TRADOC standard scenarios and studies depicting proposed, new, or modified force structures, equipment, and concepts of employment.) He also participated in the Army force structuring process through the annual Total Army Analysis and in logistics manpower analysis of new organizations, concepts, and items of equipment.

The Director, Operations and Administration furnished resource management and general administrative support and evaluated and coordinated the efforts of the LOGC staff. Most importantly, the directorate insured

that the Center's products were total packages, best suited to support the Army in the field.

Major Reorganization

Staff adjustments at the LOGC reflected not only ordinary personnel changes, but changing programs and emphases as well. Several significant organizational changes and realignments occurred within the LOGC family during this period (see figures 3 and 4). The most dramatic alteration transpired in August 1977, with the abrogation of the Office of the Deputy Chief of Staff for Operations (ODCSOPS) and the creation of a new directorate, the Operations and Administration Directorate. As part of this change, the Administrative Support Office, formerly under the Command Group, was renamed the Administrative Division and placed under the direct supervision of the new directorate. With the abolition of the ODCSOPS, the functions of the Restructured General Support (RGS) Office and the Corps Automation Requirements (CAR) Office shifted to the Concepts and Doctrine Directorate and the Operations Analysis Directorate, respectively.[9]

TRADOC instructed the LOGC to establish a mission capability in the area of force structuring. During July and August 1978, command decisions established this capability by combining the Force Analysis Division of the Evaluation and Test Directorate and the Force Design Branch of the Concepts and Doctrine Directorate into the Force Structure Assessment Division under the Force Structure and Test Directorate.[10] (See figure 5.)

To better perform the LOGC role in the force structuring process, the Evaluation and Test Directorate reorganized and redesignated itself the Force Structure and Test Directorate.[11] As part of this move, the Force Analysis Division became the SCORES Division with the additional requirement for development of logistics operations plans, annexes, and overlays at theater, corps, division, battalion, and smaller unit levels for TRADOC standard operational scenarios. An additional responsibility included coordination of the preparation of these operation plans, annexes, and overlays for associated schools' organizations, thus insuring the description of current logistics doctrine.[12] (See figure 6.)

In his annual report to the TRADOC Commander, General Smith put the change succinctly when he noted that, "This division is designed to be the focal point for coordination and control of force structure activities within the LOGC." But, he continued, "there are several significant problems in getting this activity going." While the LOGC took various initiatives, including the preparation of a supplement to TRADOC Regulation 11-1, "we are severely hampered by the lack of personnel spaces to

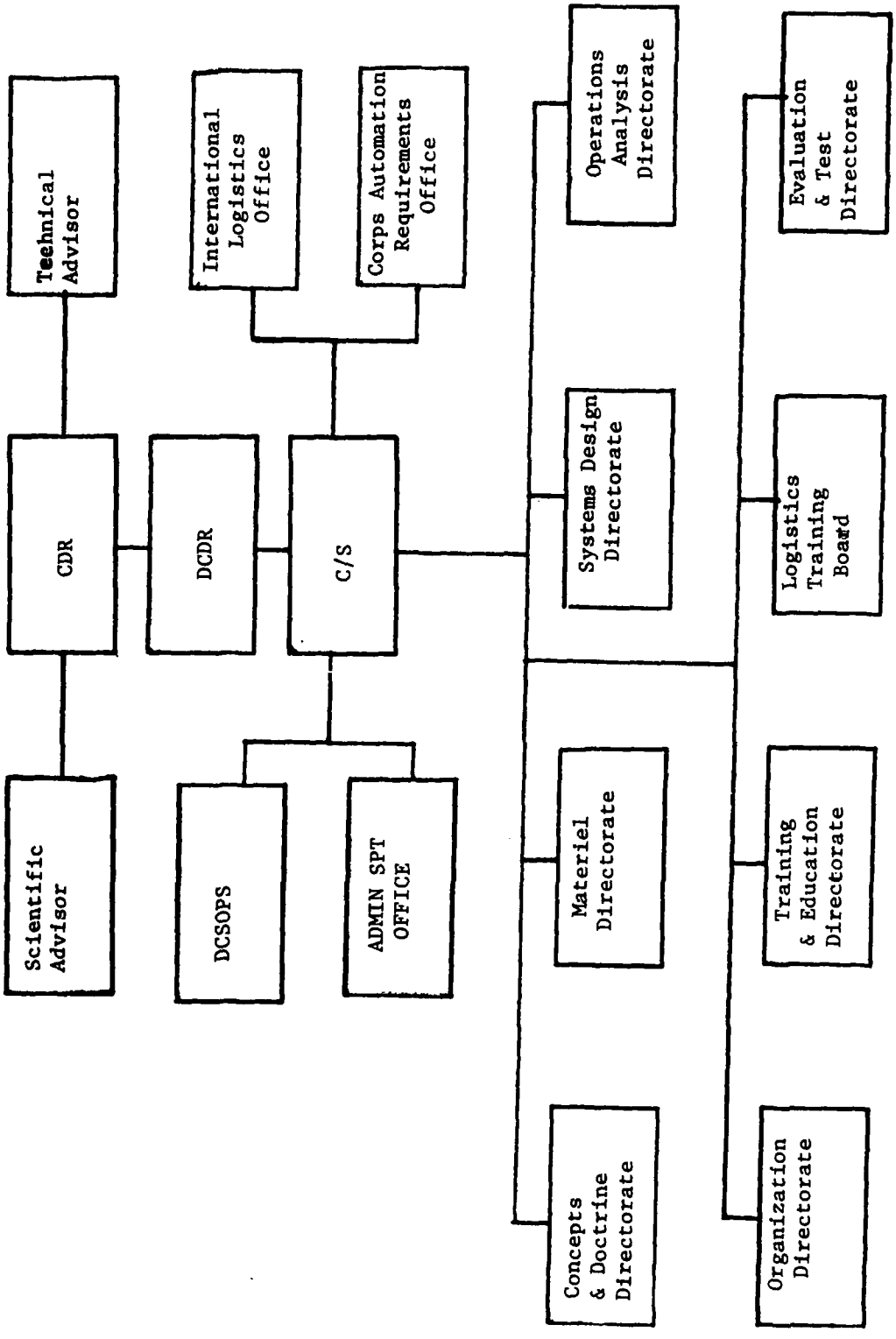

Figure 3 US Army Logistics Center Organization Chart (FY 1977)

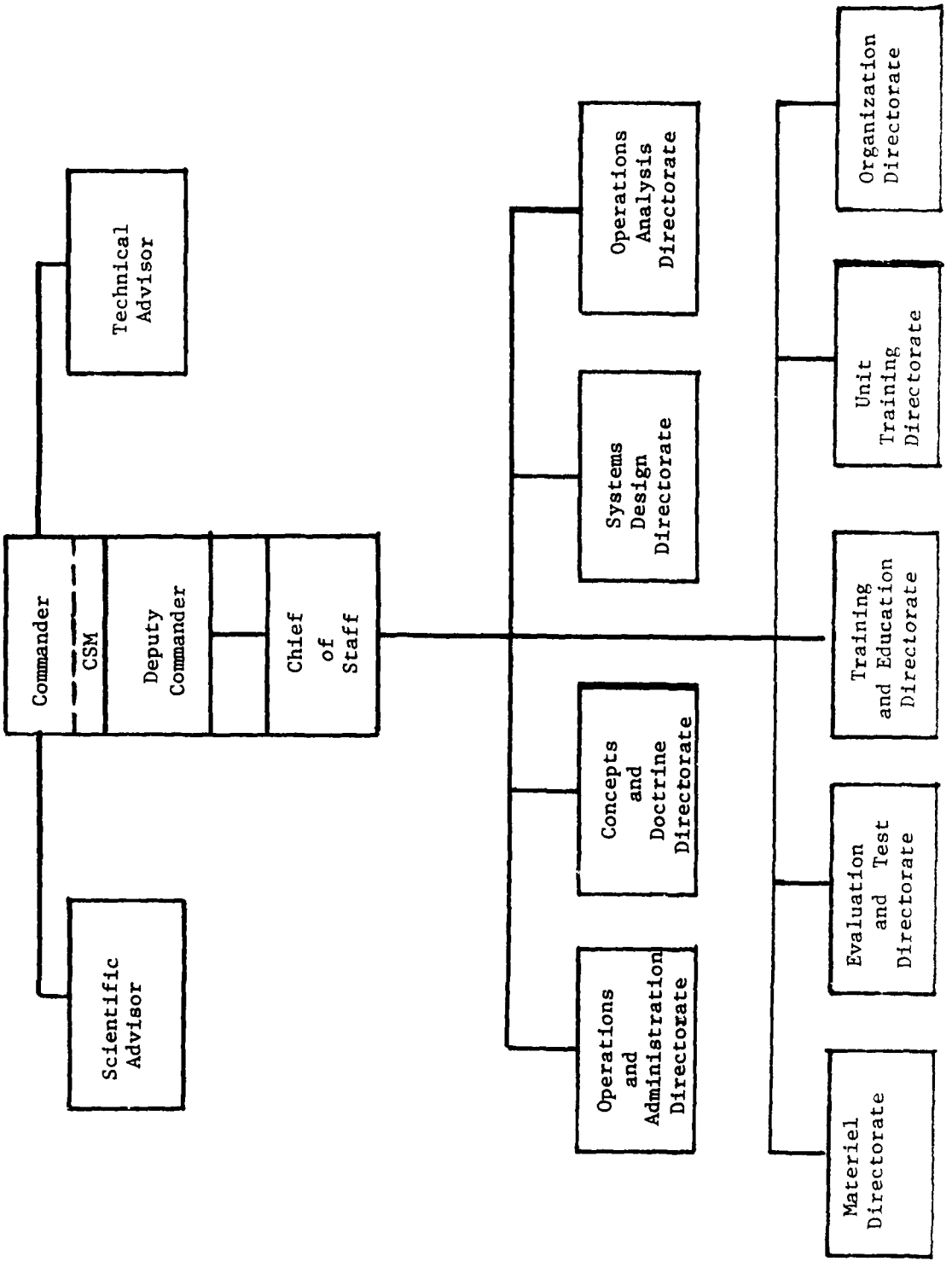

Figure 4 US Army Logistics Center Organization Chart(FY 1978)

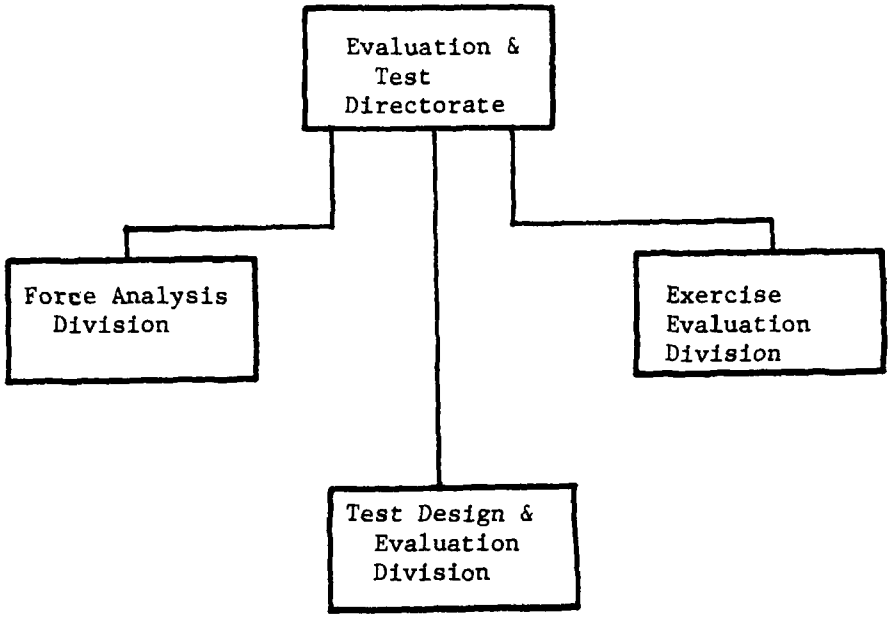

Figure 5 Evaluation and Test Directorate

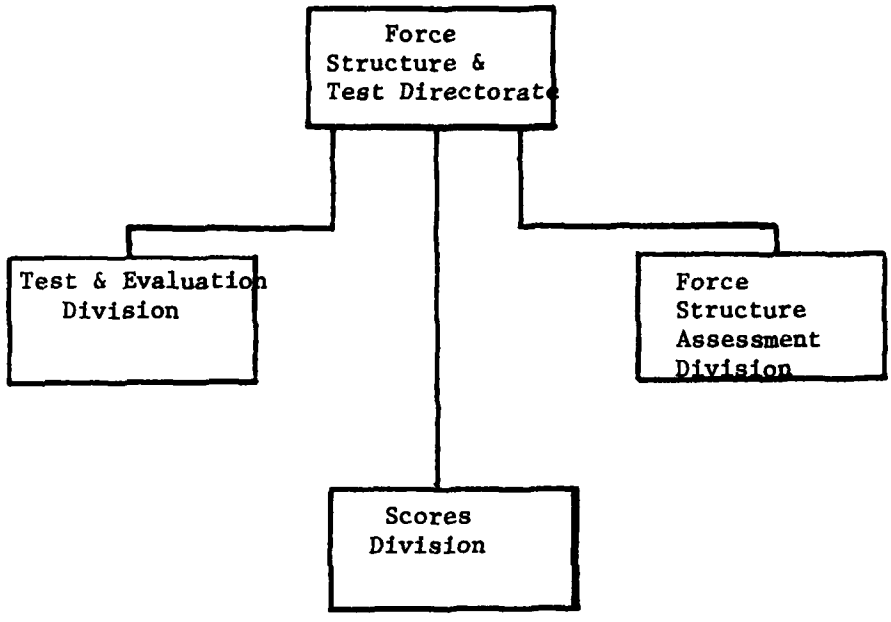

Figure 6 Force Structure and Test Directorate

allocate to this activity which of course must compete with all the other high priority actions we have." Smith went on to say that, "the absence of a functional TRADOC Trade-Off Analysis methodology and the lead-time involved in acquiring recognized in-house computer support affects our ability to respond to force structuring requirements." Finally, he concluded that, "without increased resourcing, the requirements of TRADOC Regulation 11-1 will not be met except for a few systems which have the highest TRADOC priority."[13]

Effective 17 October 1977, the Concepts and Doctrine Directorate reorganized for better management and productivity. (figures 7 and 8.) To better integrate repair parts studies and associated doctrinal development, the Repair Parts Division of the Materiel Directorate became part of the Concepts & Doctrine Directorate's Functional Logistics Division. The consolidation resulted in a more concerted repair parts program. To facilitate the development of doctrinal literature, the Literature Branch evolved into an office, a designation appropriate to its mission. During this realignment, the International Rationalization, Standardization, and Interoperability Office was established on 17 October 1977. Having a mission closely related to field support, the Force Design Branch conjoined with the Logistics Support Division. With the more compatible placement of the force design and literature functions, the Force Design and Literature Division disbanded, resulting in a 2-division directorate with an improved span of control.[14]

The Systems Design Directorate realigned on 2 September 1977 to provide for improvements in management and productivity. The Quality Assurance Division changed to the Plans and Management Division and replaced the Field Systems Division, the Maintenance and Transportation Division, and the Supply Division. The Field Operations Division became the SAILS Division, which consisted of four branches: SAILS AB Branch, SAILS ABX Branch, Support Branch (PAC), and Procedures and Assistance Branch.[15] (See figures 9 and 10.)

In order to maximize utilization of personnel, enhance management, and provide more responsive service to other LOGC directorates and external agencies, the Operations Analysis Directorate was realigned on 15 March 1978. (The realigned directorate is depicted in figure 12.) (The former organization is reflected in figure 11.) Because of the acceleration of and the increased emphasis on the Planning Factors Management mission, the Planning Factors Management Office became not only the Planning Factors Management Division but a structured division as well. The new division also included the Logistics Data Branch, which provided primary support for the other elements of the division. This combination provided a continuity of operations from the development and validation of a planning factor to the installation of the factor

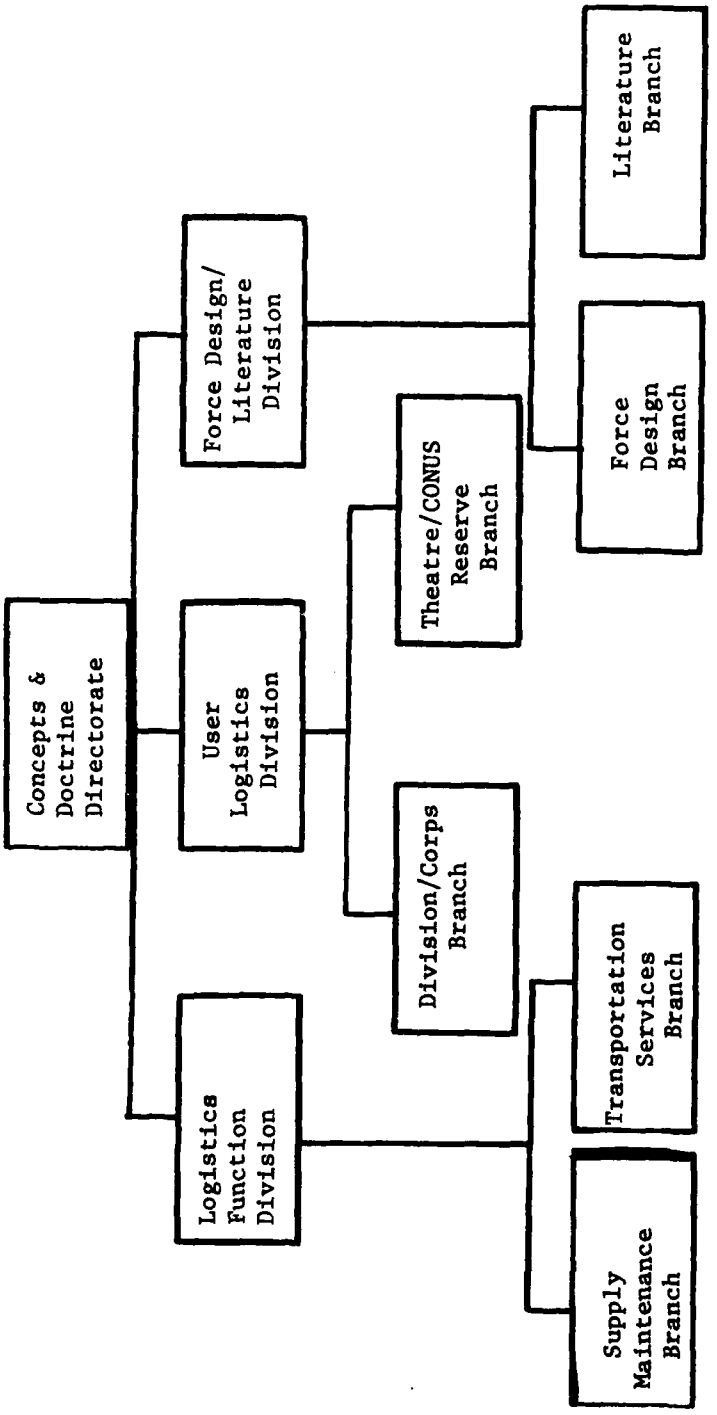

Figure 7 Concepts and Doctrine Directorate (FY 1977)

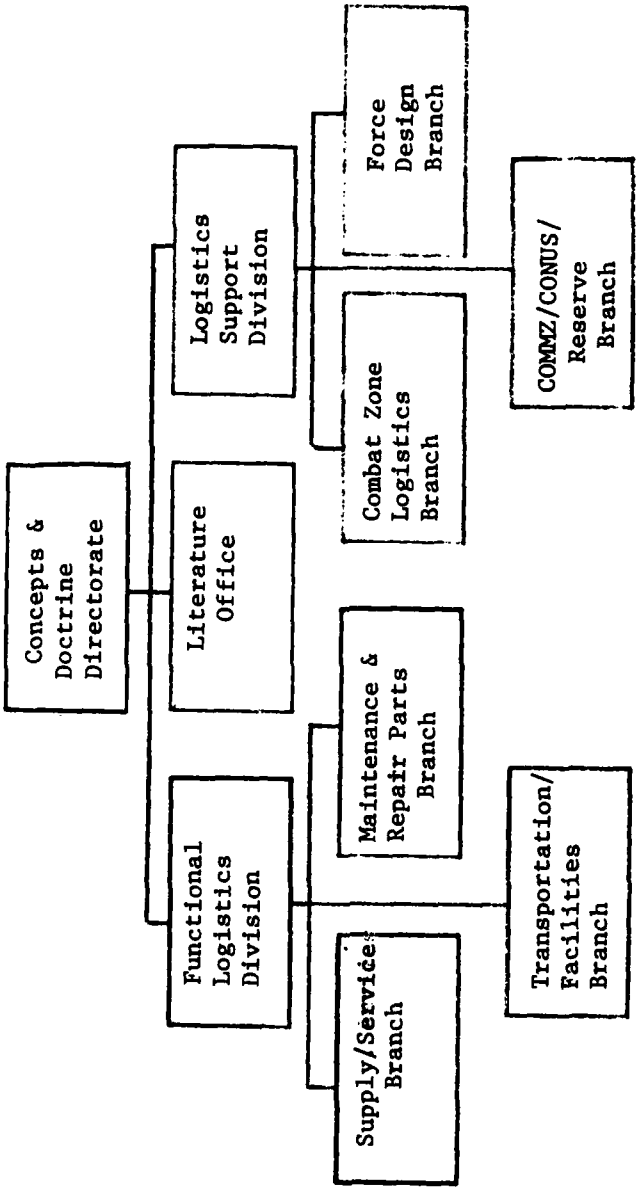

Figure 8 Concepts and Doctrine Directorate (FY 1978)

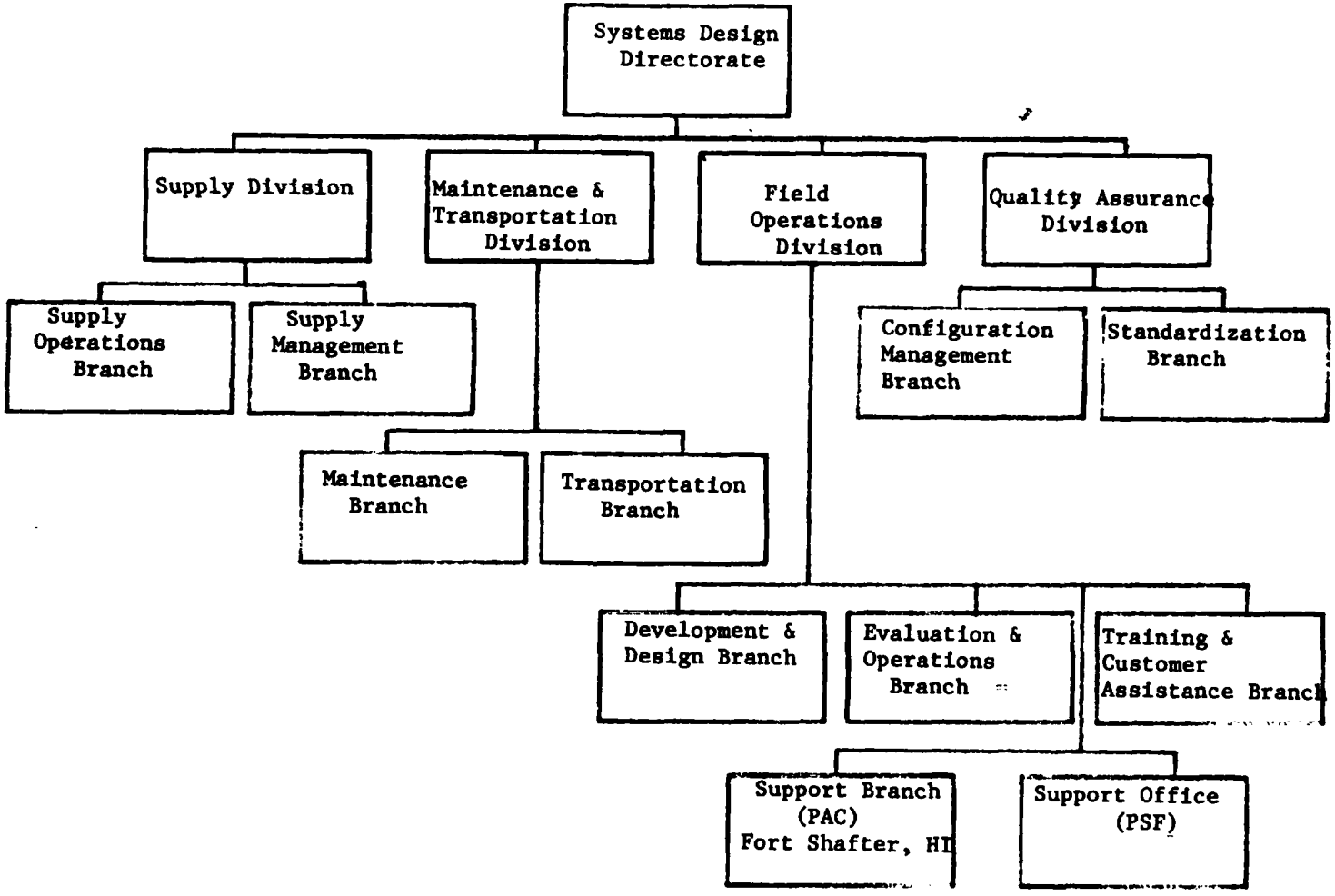

Figure 9 Systems Design Directorate (FY 1977)

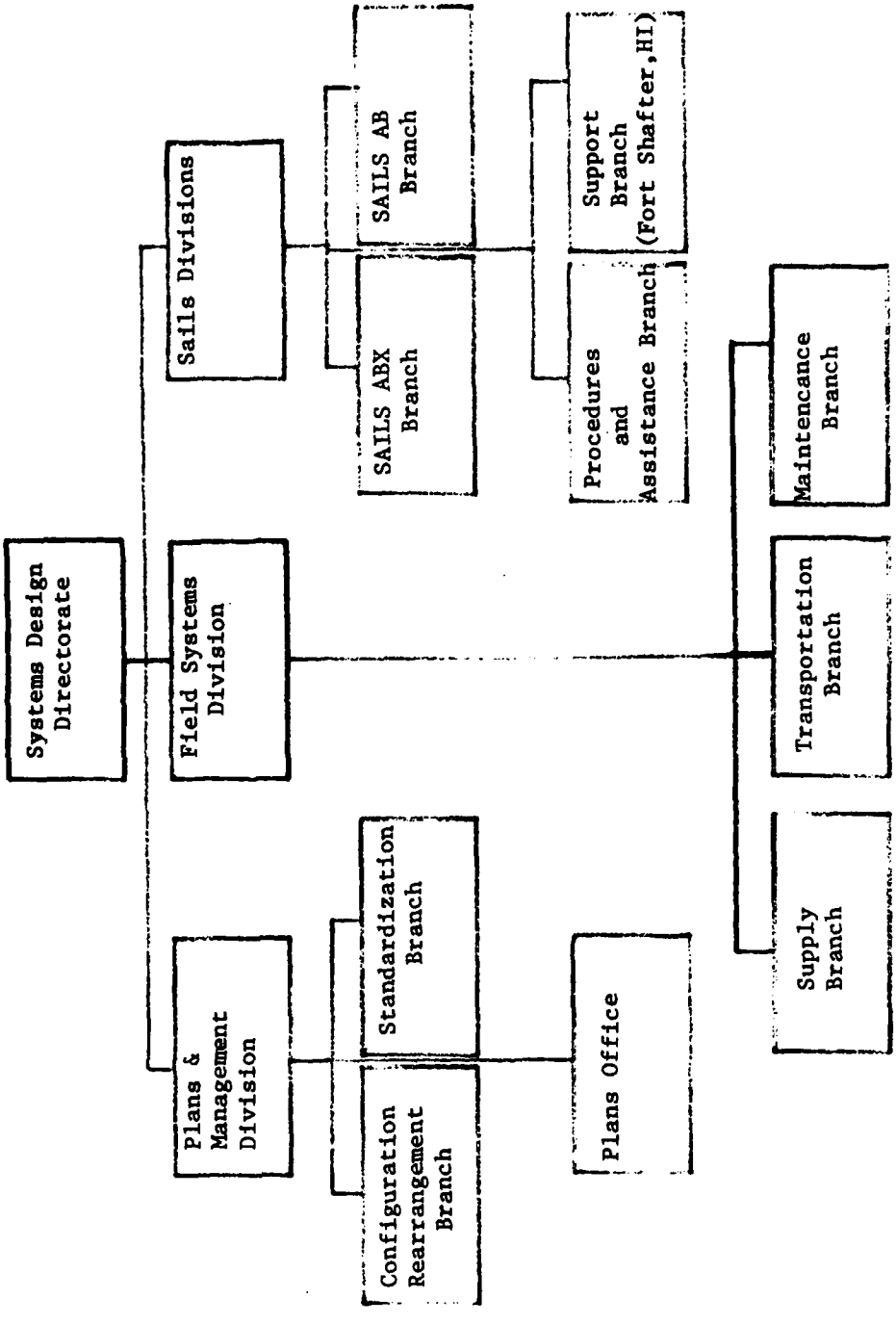

Figure 10 Systems Design Directorate (FY 1978)

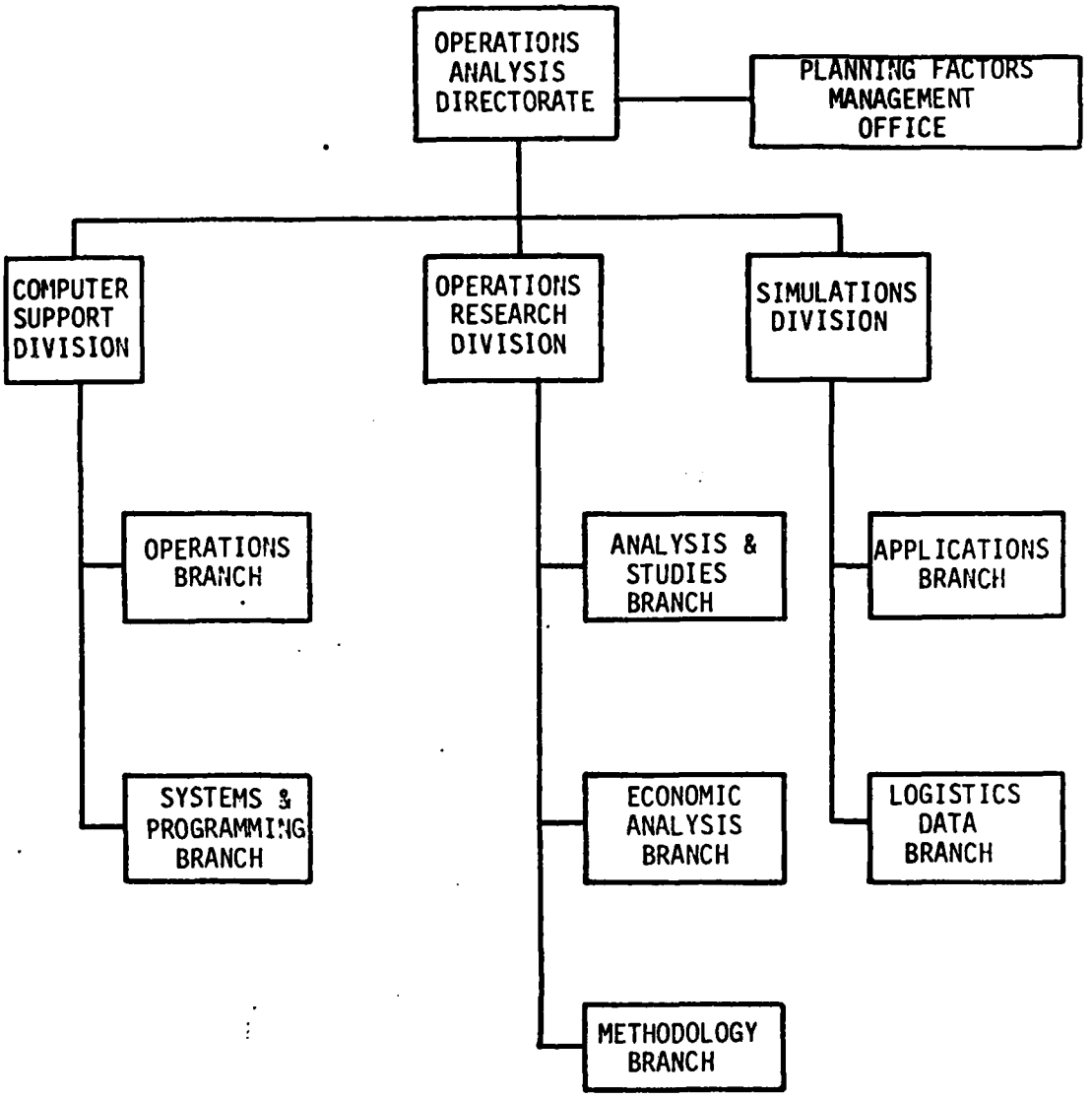

Figure 11 Operations Analysis Directorate(Fre 15 Mar 78)

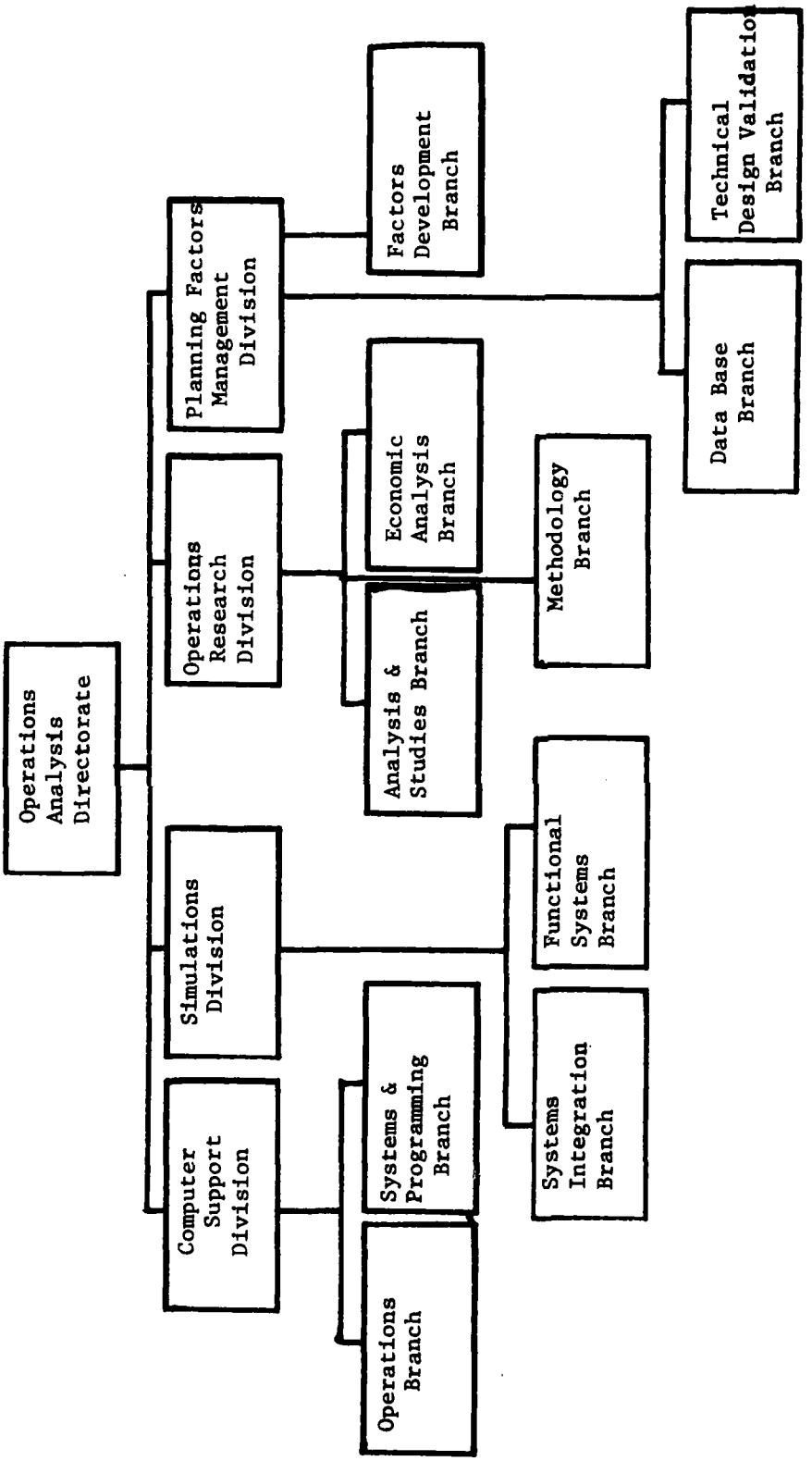

Figure 12 Operations Analysis Directorate (Post 15 Mar 78)

into a data base for retrieval as required by client requests. The realignment facilitated the accomplishment of the following objectives:

a. Provided a focal point for managing the development and dissemination of logistics planning factors.

b. Determined requirements and then collected and consolidated data to develop planning factors.

c. Participated in studies and planning pertinent to planning factors development.

d. Designed, developed, and maintained planning factors, data bases, and application programs.

e. Provided statistical and field validation of planning factors. Concurrent with the establishment of the Planning Factors Management Division, the Simulations Division was realigned to provide for a greater degree of functional specialization.[16]

Headquarters, TRADOC establishd the US Army Training Board (ATB) during FY 77 at Fort Eustis, Virginia. The new organization's personnel spaces came from the recently disestablished Combat Arms Training Board and from the LOGC. Eight spaces were withdrawn from the LOGC for this purpose. TRADOC gave the LOGC these personnel spaces in 1974 for formation of the Logistics Training Board (LTB). The ATB functioned as the TRADOC coordinator of unit training management activities. Eight spaces withdrawn from the LOGC were taken from the LTB as part of this overall action (figure 13).[17]

Simultaneously, the LOGC announced the redesignation of the LTB as the Unit Training Directorate effective 1 October 1977. The new Directorate consisted of two divisions--the Training Exercise Division, which prepared and conducted the DA-directed, JCS programmed National Command Post Exercise, LOGEX, plus related exercise functions and the Training Assistance Division, which managed the LOGC functions relating to training developments for support of logistics unit training. These latter functions included management of the logistics community's ARTEP and TEC programs, reviews of training literature and documents pertaining to new equipment for logistics unit training implications, and other studies, policies, and actions designed to improve training readiness of logistics units. The Training Assistance Division was redesignated the Training Developments Division since that title was more descriptive of its functions under the new organizational alignment (see figure 14).[18]

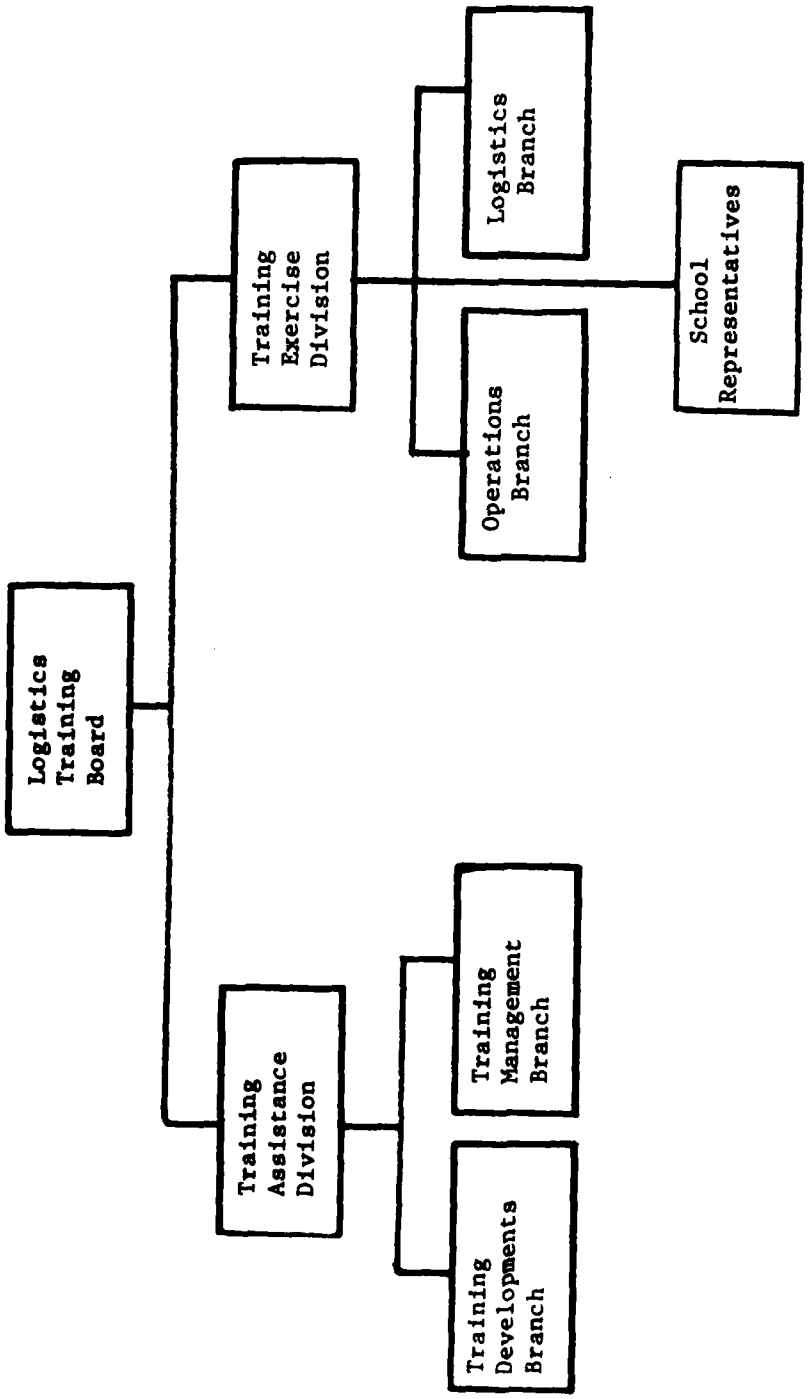

Figure 13 Logistic Training Board

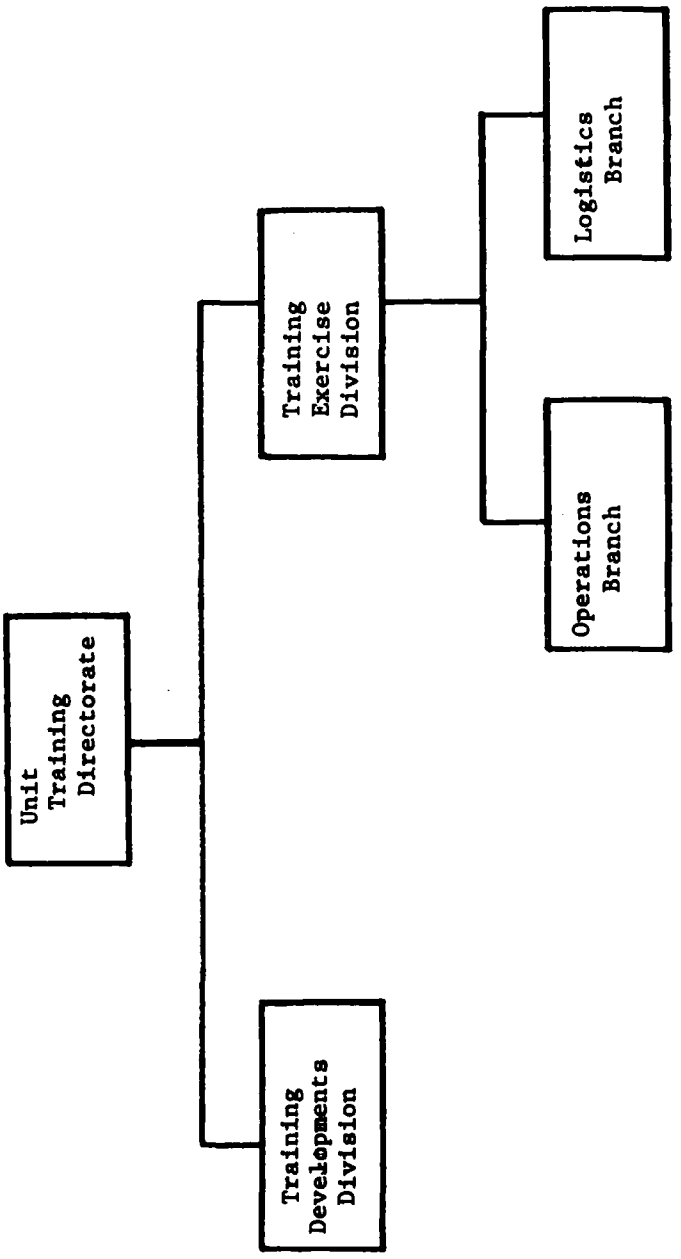

Figure 14 Unit Training Directorate

When the LOGCAB was established back in 1973, its stated purpose was to "provide advice, assistance, and counsel to the Commander, USALOGC, in the development of logistics programs designed to improve the efficiency and effectiveness of the Army logistics system." During the ensuing 5 years, the Board met semiannually at Fort Lee and accomplished its mission, in the words of General Smith, "in an outstanding and most noteworthy manner." However, General Smith felt that the Center had reached a level of maturity that it no longer needed the LOGCAB as originally envisioned and constituted; therefore, he proposed to Lt Gen Eivind H. Johansen, DCSLOG, DA, at the LOGCAB IX meeting that the existing LOGCAB be dissolved and the Army Logistics Policy Council (ALPC) be expanded to meet existing needs. LTG Johansen agreed. Therefore on 30 June 1978, General Smith advised all the LOGCAB members of the dissolution and thanked them for their participation. (See figure 15 for a comparison of LOGCAB and ALPC members and Figure 16 for recommended ALPC members and attendees.)[19]

The final, major change in the LOGC organizational apparatus involved the mission realignment of the USALOGC Support Branch, Pacific. This action transfered functions associated with the development, extension, and maintenance of the Standard Army Intermediate Level Systems (SAILS ABX) from Fort Shafter, Hawaii, to Fort Lee, Virginia. The realignment improved command and control, lowered operating costs, and reduced the complexity of data systems development, extension, and maintenance. The realignment located SAILS ABX with the LOGC at Fort Lee, the source of functional guidance for all logistics systems. Transfer occurred in two phases: Phase I, effective 1 July 1978, and Phase II, effective 1 October 1978.[20]

Integrating With Other Logistics Activities

At the time the LOGC redefined its own internal organizational structure, it clarified its relationship with the associated logistics-oriented schools. In a move designed to allow the LOGC assumption of its responsibility as an "integrating center," DA and TRADOC announced on 9 September 1977 that commencing October 1, 1977, the Quartermaster Center and School at Fort Lee (USAQMS); the Army Ordnance and Chemical Center and School (USAOCC&S) at Aberdeen Proving Ground; the Army Transportation Center and School (USATSCH) at Fort Eustis, VA; and the Army Missile and Munitions School (USAMMCS) at Redstone Arsenal, AL, would report directly to the Commander, USALOGC.[21]

"One of the problems is that all too often we tend to forget that quartermaster, ordnance, transportation and chemical officers are all in the logistics business," noted Gen Smith, LOGC Commander. "As an integrating center, we will coordinate internally all the associated schools and

POSITION	LOGCAB	ALPC
DARCOM - DCG for Materiel Readiness	member	member
TRADOC - DCSLOG	member	member
FORSCOM - DCSLOG	member	member
USAREUR - DCSLOG	member	member
EUSA - ACOFS, J-4	member	member
USARJ - Chief of Staff		member
LOGC - Commander	member	member
TSG - Director, Health Care Operations		member
USACC - Deputy Commander		member
NGB - DARNG		member
OCAR - Deputy Chief		member
DLA - Director	observer	member
GSA - Commissioner, Federal Supply Service		member
USAREDCOM - Dir of Log, J-4		member
QMS - Commandant	observer	member
M&MS - Commandant	observer	member
DA - DCSLOG	Chairman	Chairman
Chief, Army Reserve - HQDA	member	
Chief, NGB - HQDA	member	
DCST, TRADOC	member	
ACS, G-4, USAJ	member	
ASA (IL & FM)		observer
AWC - Director, Materiel Systems Management		observer
C&GSC - Director, Department of Resource Management		observer
DCSCD, TRADOC	observer	
*CDR, USACAC	observer	
*CDR, USA ADMINCEN	observer	
*CDR, USAO&CC&S	observer	
*CDR, USATC&S	observer	
*CMDT, ALMC	observer	
Director, Logistics Plans, Readiness and Systems, ODCSLOG, DA	observer	
*CDR, USACSC	observer	

Figure 15. Comparison of LOGCAB/ALPC

Director for Readiness, US Army Materiel Development and Readiness Command
Director of Supply and Maintenance, ODCSLOG, DA
Director, Resource and Management, ODCSLOG, DA
Director of Transportation, Energy and Troop Support, ODCSLOG, DA
Chief, Aviation Logistics Office, ODCSLOG, DA
Office of Assistant Secretary of the Army (IL & FM)
Commander, US Army Logistics Evaluation Agency
Commandant, Signal School
Commandant, Engineer School

RECOMMENDED ALPC MEMBERS

Commander, US Army Ordnance and Chemical Center and School (USAO&CC&S)
Commander, US Army Transportation Center and School (USATC&S)
Commander, US Army Computer Support Command (USACSC)

RECOMMENDED ALPC ATTENDEES

Director for Readiness, US Army Materiel Development and Readiness Command
Director of Supply and Maintenance, ODCSLOG, DA
Director, Resource and Management, ODCSLOG, DA
Director of Transportation, Energy and Troop Support, ODCSLOG, DA
Chief, Aviation Logistics Office, ODCSLOG, DA
Office of Assistant Secretary of the Army (IL & FM)
Commander, US Army Logistics Evaluation Agency
Commandant, Signal School
Commandant, Engineer School
Commandant, US Army Logistics Management Center
Director, Logistics Plans, Readiness, and Systems, ODCSLOG, DA

Figure 16. Recommended ALPC Attendees

centers in our particular field of expertise--logistics." General Smith explained that "the primary responsibilities will be formulating or changing logistical doctrine as necessary; developing needed materiel and logistics training for the Army, training the support elements; and providing any other logistical support for training necessary." The realignment made the functions and responsibilities of the LOGC more compatible with those of the Army's other two integrating centers: The Army Combined Arms Center at Fort Leavenworth, KS, and the Army Administrative Center at Fort Benjamin Harrison, IN. "You see, there are really three groupings of arms and services," Smith argued. "We have the combat arms which generally includes artillery, air defense artillery, infantry, armor and some associated elements like the corps of engineers. Secondly, there are the administrative services like the adjutant general, the chaplains, and the medical service corps. And finally, the logistics services. Each of these has its own integrating center where necessary doctrine, training and combat developments are done in their particular area of expertise. Each coordinates both internally and between each other to insure that the Army has what it needs to fight, to support the combat and to provide administrative services. For example, at Fort Benning, GA, they teach logistics as part of the basic and advanced courses. The logistics doctrine they teach comes from us and is coordinated through the Army's Combined Arms Center at Fort Leavenworth and the Infantry School itself. In the logistics area, we task each of the four associated schools with tasks that are functionally theirs alone. We also review their work and we interface with TRADOC as well as the other major commands." Concluding, General Smith noted that "We are the center of the logistics expertise in the Army, and we intend to do our best in providing that expertise to the rest of the Army."[22]

In further recognition of the LOGC mission, Class IX doctrinal responsibility was withdrawn from the USAQMS on 16 May 1977 and reassigned to the LOGC.[23]

Finally, the Center continued as the TRADOC executive agent in all matters pertaining to the Reliability, Availability, and Maintainability program. On 1 August 1977, as part of the reorganization of the ODCSOPS and the creation of OPS/ADMIN the Integrated Logistics Support (ILS) management office function was transferred first to the Assistant Chief of Staff, and when that office disbanded in mid-September 1977, ILS returned to the Program Evaluation Branch of the OPS/ADMIN Directorate.[24] The ILS management office served as TRADOC executive agent for ILS plans, policies, and procedures and coordinated such matters internally in the logistics community and externally for TRADOC.

City Point Room

On 7 February 1978, the "L" (Ad Hoc) Room of the LOGC was redesignated the City Point Room in honor of the supply depot of that name which gallantly supplied the Union Army with needed supplies and materiel during the Civil War. Now known as Hopewell, Virginia, City Point came to symbolize the vital function logistics played in the North's winning of the Civil War; renaming the "L" Room, "City Point Room," also illustrated the continuity of logistics and its importance in today's Army as well as the function of logistics of which supply is an element.[25]

Somervell Hall

The LOGC marked its coming of age with the dedication on 1 July 1977 of Somervell Hall, the first Army administrative complex constructed in the past 10 years. Built at an estimated cost of 6.7 million dollars and embodying some of the most contemporary functional and aesthetic features, this concrete and glass structure housed both the LOGC and the CSCSG. Named in honor of General Brehon Burke Somervell, World War II Army Service Forces Commander, Somervell Hall symbolized the importance of logistics to the Army.

The then commanding general of the LOGC, General Graham, said it best when he remarked at the dedication ceremony that Somervell Hall symbolized the growing stature of the LOGC and CSCSG, and reflected the Army's interest in combat service support.[26] In his dedication address, Lt Gen Kenneth B. Cooper, Deputy Commander in Chief, US Army Europe, echoed General Graham, adding that, "the chatter of typewriters has become as vital to America's defense effort as the clatter of machine guns once was, and the Army must excel in administration as well as combat." Somervell Hall, Cooper continued, "incorporates two administrative bodies whose missions are...--to be sure that the Army has the best equipment, the right organizations, and the correct training and instruction to support the modern soldier in the field." In concluding his address, General Cooper noted that Somervell Hall "is a monument to a man who was determined to succeed because the mission was important, not because he sought the limelight. You who work in this building," Cooper continued, "have all indirectly benefitted from General Somervell's dedication, for the very existence of this building is testimony to the increased recognition the Army has given logistics since World War II."[27]

The presentation of a portrait of General Somervell to the LOGC highlighted the dedication ceremony. Given by Mrs. Stephen A. Wilson, the former wife of the artist, Orland Campbell, the portrait was hung in the Center's main lobby.[28]

On 12 September 1977, the Society of Logistics Engineers formally presented the LOGC with complete copies of General Somervell's papers, speeches, and printed articles.[29]

Notable LOGC Visitors

This period saw a steady stream of notable visitors to the LOGC. In addition to Lt Gen Camm and Lt Gen Cooper, Maj Gen Bernard Gruber of the German Army, Ordnance Troops and Service Support for all Army forces, made a day long call on 8 May 1978. General Gruber's visit was part of the TRADOC Commander's ongoing program to improve United States/Federal Republic of Germany (US/FRG) Armies interoperability.[30]

In addition to General Gruber, the following high ranking foreign officers visited the Center during this period:

BG George Gahnberg, Director of Maintenance, Swedish Defense Materiel Administration: 22 Apr 77

COL Chian Teitelbaum, Head of Logistics Division, and COL Joram London, Ordnance Administrative Advisor and Coordinator, Israeli Defense Force: 29 Sep 77

MG Hosseini, Chief of Supply, Iranian Army, and BG Farahbakhsh, Chief of Computer Ops, Iranian Army: 14 Oct 77

Brigadier David Houston, CBE, British Military Attache, Washington, DC: 7 Dec 77

MG Moshe Pele, GOC Israeli Defense Force, Armor Corps: 15 Dec 77

BG Shin, Suk-Yeon, Chief, Inventory Control Center, ROKA: 22 May 78

COL Dudley B. Carnie, British Liaison Officer (C&E), British Embassy; Washington, DC: 11 Sep 78

COL Yong Seon Lim and MAJ Dong-Jun Hwang, ROKA: 21 Sep 78.[31]

In addition to others cited, significant American visitors were:

LTG Frank A. Camm, Deputy Commander, TRADOC: 5 Jan 77

LTG Jack Fuson, Deputy Chief of Staff for Logistics, DA: 1 Feb 77

MG Robert Hixon, Chief of Staff, TRADOC: 19 Apr 77

LTG Kenneth B. Cooper, Deputy Commander in Chief, USA Europe: 1 Jul 77

LTG Frank A. Camm, Deputy Commander, TRADOC: 28 Jul 77

LTG Eivind H. Johansen, Deputy Chief of Staff for Logistics, DA: 30 Sep 77

General Donn A. Starry, Commander, TRADOC: 15 Dec 77, 1 Mar 78

General John R. Guthrie, Commander, USA Materiel Development and Readiness Command (DARCOM): 16 Dec 77

Honorable Walter B. LaBerge, Under Secretary of the Army: 1978

Members of the President's Commission on Reorganization of the Government: 18 May 78[32]

Funding

The Center Command Operating Budget Estimates for FY 77 and FY 78 were $10,108,200 and $10,848,000, respectively. Of that, $986,700 (FY 77) and $938,500 (FY 78) were earmarked for TDY. FY 77 and FY 78 amounts reflect actual costs incurred for operation and maintenance of the Logistics Center. Budget estimates for FY 79 and FY 80 were $13,198,700 and $12,922,900 respectively. The latter figures represented programmed amounts which have been (FY 79) and will be provided (FY 80) by TRADOC and FORSCOM.

FY 80 unfinanced requirements appeared in the Center operating budget; they were:

Priority #	Description	Amount (Thousands)
1 (FORSCOM)	LOGEX 80 Support	$ 21.8
1 (TRADOC)	Development of COMMZ	697.7
2 (TRADOC)	SAILS Contract Support	165.0
3 (TRADOC)	LOGEX Developments	86.4
4 (TRADOC)	Planning Factors Data Base	125.0
5 (TRADOC)	Maintenance Task Demand File	60.0
6 (TRADOC)	Tactical Wheeled Vehicle Office	682.9
	TOTAL	$1,838.8[33]

	30 September 1976	30 September 1977	30 September 1978
TDA Authorized	604	604	606
TDA Assigned	558	528	544
Officers			
TDA Authorized	185	192	201
TDA Assigned	154	149	148
Civilians			
TDA Authorized	343	341	333
TDA Assigned	319	305	326
Enlisted			
TDA Authorized	67	71	72
TDA Assigned	73	74	70

(2 July 1979 MFR from Mr. Richard Wilcox, Management Sciences Branch, OPS/ADMIN Directorate)[35]

Figure 17. Changes to the LOGC TDY over a 2-year period.

	September 1976	August 1977	April 1978
1.	Implement FOCUS 76	Improve training assistance to logistics units	Improve training assistance to logistics units
2.	Improve repair parts support	Analyze and improve internal logistics at the company/ battalion level	Develop, evaluate and refine the division logistics support as part of the division restructuring effort
3.	Analyze and improve internal logistics at the company/ battalion level	Develop, evaluate and refine the division logistics support as part of the division restructuring effort	Develop, evaluate and implement the restructured general support in the corps
4.	Analyze and improve division logistics support operations and structure	Evaluate and prepare an implementation plan for restructured general support and execute follow-on action as applicable	Develop, evaluate, extend and maintain the Standard Army Intermediate Level Supply Subsystem (SAILS) to applicable Army organization
5.	Analyze and improve corps logistics support operations and structure	Improve repair parts support	Improve career development of professional logistics personnel
6.	Analyze and improve CONUS installation logistics support operations and structure	Develop, evaluate, extend and maintain the Standard Army Intermediate Level Supply Subsystem (SAILS) to applicable Army organizations	Provide intransit asset visibility to corps level

Figure 18. Comparison of LOGC's Major Program Objectives 1977--78

	September 1976	August 1977	April 1978
7.	Provide intransit asset visibility to division level	Develop, evaluate, extend and maintain the Decentralized Automated Service Support System (DAS3) to applicable Army organizations (DS4 and SAMS)	Collect or develop and disseminate logistics planning factors for the Army
8.	Maximize utilization of container systems	Develop the MIS-ADP support concept for the corps (Project CAR)	Develop, evaluate, extend and maintain the Direct Support Unit Standard Supply System (DS4) to applicable Army organizations
9.	Improve force readiness through development of an enhanced TI/QC program	Improve career development of professional logistics personnel	Develop, evaluate, extend and maintain the Standard Army Maintenance System (SAMS) to applicable Army organizations
10.	Relate logistics resources to combat effectiveness	Provide intransit asset visibility to corps level	Insure that all aspects of the Integrated Logistics Support (ILS) Concept are applied to systems/materiel items through the acquisition cycle
11.	Improve training assistance to logistics units	Relate logistics resources to combat effectiveness	Reduce the supply transaction volume on the centralized corps computer
12.	Accelerate the standardization of functional ADP systems for logistics management and operations		Develop logistics operations/doctrine organization for the Army behind the corps
13.	Improve career development of professional logistics personnel		

Figure 18. (Cont'd)

Manpower

During the FY 77 and FY 78 periods, the LOGC continued to experience increases in workload, primarily in the SAILS, Transportation Operational Property System and Planning Factors Management mission efforts. Concurrently, the percent of support, manpower authorizations versus manpower requirements, within the Center decreased from 89 to 85 percent. In an attempt to achieve programmed workload, LOGC management accomplished the following actions:

a. To economize clerical support, the Center established the Word Processing Center. Manpower authorizations saved as a result of this action were reprogrammed within the Center to establish new professional positions in support of mission requirements.

b. Overhire positions were created to compensate for hire lag in allocated end strength.

c. Liberal overtime was also utilized.

d. Management tools; i.e., management surveys and quarterly reviews, were employed to maximize resource utilization.[34]

Change of Command

General Smith's assumption of command from General Graham (28 July 1977) entailed no sharp breaks in policy or program. General Smith had served as the Defense Attache, US Embassy, Saigon, Republic of Vietnam, from September 1974 through September 1975, where he actively participated in the evacuation of over 45,000 Americans and Vietnamese in the closing days of the war. Following that harrowing experience, General Smith served as TRADOC Deputy Chief of Staff for Logistics. Prior to assuming the LOGC command, General Smith had been fully briefed on work in progress.

The Center marked a peak in the General's impressive career; it is, he commented, "the place where you have the greatest opportunity to influence how the Army logistical team is going to support the rest of the Army over the next 10 to 25 years. This is really one of the best logistics' jobs you can have and, after all, that's the kind of business I'm in."[37]

In a 1 February 1979 letter to Maj Gen Harry A. Griffith, Chief, Joint Military Assistance Group - Korea, General Smith highlighted his concern and views about logistics. "Actually," he wrote Griffith, "there is little new in logistics doctrine... The so-called 'fix forward' concept has always been a way of doing business in the ordnance lexicon.

The idea is to do the job in the simplest possible manner with the goal of getting the equipment back in the hands of the user in the quickest way possible." The General noted that, "the first four letters of logistics and logic are the same. We ought to teach ourselves to support our equipment and troops in the most logical and simplest way. This approach, plus discipline--logistics discipline--supply, maintenance, and transportation--will get the job done in the least amount of time and with the least amount of effort in the long run." Concluding, General Smith argued that to convince the Army "is most difficult simply because we come from a throw-away society and even self-discipline is not abundant."[38]

Under General Smith's command, the LOGC continued many of the same policies and programs undertaken by his predecessor but with renewed vigor. In his CY 1978 report to General Donn A. Starry, Commander, TRADOC, General Smith noted the major accomplishments of his LOGC command: an invigorated master mechanic program; development of a combat service support pre-command course and a very successful 3-day Reserve Component Training Managers Conference. But he mixed the accomplishments with some sobering reminders of problem areas facing not only the Center, but also logistics. Of special concern was the area of materiel development: "The initial lack of interest in supportability for some emerging weapon systems has resulted in cost overruns, unnecessary delays, and unforseen changes in design and organizational structure." He cited the US ROLAND Program and the XM-1 Tank as prime examples.[39]

"One area of our continuing concern," Smith told Starry, "is our local ADPE support capabilities.... Considering our expanding ADPE support workload,...I feel that we must obtain some organic ADPE capability in the mid to long-range timeframe to be effective and responsive in pursuit of our mission requirements which require computer assistance."[40]

General Smith's final area of concern was the "inability of our system to provide" him with the "personnel that are needed to get an ever increasing job done within a reasonable time span..." This has been, Smith wrote, "a source of constant irritation."[41]

The LOGC Commander listed some major innovations under his command, such as logistics participation during war gaming; a 2-corps Europe III Scenario; reorganization of the force structuring process; completion of the evaluation and analysis phase of the Restructured General Support study; development of a How-to-Support literature program; institution of a Reserve Component Advisory Group to review doctrinal and force structure studies; an Improved Manpower Authorization Criteria procedures project; improvement of Logistics Center modeling and simulation capabilities and support to the schools and centers; and evolution of the Logistics

Planning Factors Management Division (PFMD) of the Operations Analysis Directorate. The PFMD is now serving as the focal point for managing and disseminating valid auditable planning factors for the Army.[42] In concluding his report, the LOGC Commander saw his Logistics Center stewardship "as a time of challenge, growth, and increasing acceptance by the Army community of the importance of proper logistics planning."[43]

In this year-end report, in his staff meetings, and in letters to fellow logisticians, the General expressed his goals for the Center to be a continuation of the excellent work begun by General Graham, devising new and better ways to meet the challenges of today's Army, and closer coordination with the TRADOC team. These were some of the ideas given the Center as the General entered his second year of command of the Logistics Center.

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CHAPTER 2

CONCEPTS AND DOCTRINE DEVELOPMENT

The most dramatic organizational alteration of the mid-1970s was the TRADOC formulated Division Restructuring Plan of 1976.[1] This plan attempted to harness the weapons of the 1970s and 1980s and the new doctrine of FM 100-5, rationally and efficiently, to the Army's fighting and support organizations. FY 77 and FY 78 saw extensive planning toward major testing of the Restructured Division at Fort Hood, Texas. In addition to this program, doctrine and materiel advances necessitated many organizational changes. Some occurred within the existing organizations, while others involved weapon additions or designs for new organizations or organizational concepts. By policy and necessity, combat developers tried to work the best balance of cost and increased combat power into the new and revised tables of organization and equipment.

Division Restructuring

The decision to restructure the armored and mechanized infantry divisions aroused considerable attention during FY 77 and FY 78. Conceived in 1976 and approved by the Army Chief of Staff for testing that summer, the restructuring proposal became the first fundamental change in Army Divisions since creation of the ROAD Divisions in the early 1960s.[2] In FY 77, it attracted critical attention.

Recognizing the need to develop the optimum size, mix, and organization of the US Army divisions for the FY 80-85 timeframe, the TRADOC Commander initiated the Division Restructuring Study (DRS) in May 1976. The overall concept not only called for a clear alternative to the present organization but also demanded a performance and cost measurement. The proposed restructured division incorporated smaller battalions and companies. It elevated supply, dining, and administration from company to battalion level in a combat service support company. It consolidated maintenance into a company or detachment for each battalion. The maintenance company included identifiable company maintenance teams, each with an armored tracked maintenance vehicle and a master mechanic. The supply section contained also an armored rearm/resupply vehicle for each maneuver company. The division support command, specifically the DMMC and maintenance battalion, underwent a weapons system orientation.

This restructured organization provided for an interaction with corresponding integrated corps supply and maintenance centers. The new Division Support Command (DISCOM) staff included a personnel and logistics staff officer, a security plans and operations officer, to coordinate the logistical support for the brigades, and three 4-man forward area support coordinators. The maintenance battalion forward support company provided backup support to the combat battalions using maintenance support teams.

The DRS organization increased the ammunition supply capability to 5,200 tons, 2-1/2 times the current capability. The medium truck cargo platoon has a water distribution capability with four 5,000-gallon water trailers. The DRS testing concept planned initially a three-phase effort: battalion, division minus, and full division with testing to be completed by 1979.

However, due to congressional funding constraints and conflicts with other high priority exercises such as REFORGER, General Bernard Rogers, Army Chief of Staff, elected[3] to combine the division minus and a reduced division test into one test.

Division Restructuring Evaluation (DRE). In recognition of the progress of the division restructuring effort, the former division restructuring study was upgraded to an evaluation. The Phase I (Battalion) Test finished on schedule in December 1977. The LOGC conducted a map exercise at that time. The capability of the combat service support (CSS) units to support the restructured division underwent analysis and USACAC received the results in late February 1978. On 16 January 1978, the Vice Chief of Staff, US Army (VCSA), approved a proposal to modify the division, minus field test, scheduled for September 1978. This modification will result in a brigade-size field test. CSS restructured organizations tested included the forward support company of the maintenance battalion; the forward supply platoon of the supply and services (S&S) company, supply and transport battalion (includes the ammunition transfer point (ATP)); and the maneuver battalion maintenance company. This modification resulted in a shift in emphasis from a field test of combat support and combat service support to a test of maneuver and command or control systems. The modification required increased reliance on analysis by means of war games, simulations, and models to evaluate the combat service support for the restructured division.

On 13 April 1978, a meeting was held at Fort Hood, Texas, to brief the Commander, III Corps, on a Phase II modification, to discuss minor test TOE changes and to evaluate the concept in-process review for the ATP. The LOGC and associated schools were directed by HQDA, through TRADOC, to determine the effectiveness of CSS within and behind the division utilizing models, simulations, and other analytical techniques. CACDA will provide comparative combat data from the division war games (DIVWAG) model that will permit the logistical community to compare the CSS implications of the H- versus T-series TOE support for the heavy division.[4]

In June 1978, elements of the 15th Supply and Transport Battalion, 1st Cavalry Division, Fort Hood, Texas, field tested and evaluated the ammunition transfer point in context with the DRE. The test assessed the ATP's capability to transload selected items of high volume ammunition

from corps transportation assets to user resupply vehicles. The ATP staffing consisted of an augmented TOE of 10 persons which allowed a 24-hour per day continuous operation. The test consisted of five supply cycles: Cycles 1 and 2 determined the tonnage handling capability on a sustained basis; cycles 3, 4, and 5 ascertained tonnage handling capability during surge periods varying from 11 to 18 hours in length.

LOGC initiated action in June 1978 to obtain authority to include the ATP capability in the current armor infantry mechanized (AIM) division and separate brigade TOE. In May 1978, the LOGC and associated schools developed the logistical outline analysis plan to support the analytical phase of the DRE; the plan assisted the Combined Arms Center, Fort Leavenworth, Kansas, in conducting comparative supportability analyses of organizations of current and alternative heavy divisions, in examining the adequacy of logistics structure both within and behind the division and the corps, in recommending logistical organizations for future testing and validation as new weapon systems or equipment are available, and in suggesting improvements to the current heavy division organizations and equipment.

A restructured brigade of the 1st Cavalry Division, Fort Hood, Texas, conducted a field training exercise during September 1978. In the combat service support area, data and insights were collected on the forward support company of the maintenance battalion and organic maintenance companies of the maneuver battalions, and capabilities in the forward supply platoon of the supply and service company.

Division 86. During the TRADOC Commanders' Conference conducted at the Combined Arms Center, 31 August to 1 September 1978, the Commander, TRADOC, introduced a major program which he titled, "Division 86." Division 86 evaluated the conceptual heavy division and selected support services including scheduled new weapon systems, as it would exist in 1986; it developed organizations and doctrine needed to integrate the new weapon systems into the force, and it optimized their employment. Division 86 provided for the development of tactical concepts upon which to base future doctrine, to develop training programs, and to program force structuring trade-off analyses.

To achieve the Division 86 objectives, TRADOC focused on a concept called the "Central Battle," the critical place on the battlefield where all aspects of the air-land battle, i.e., firepower, maneuver, and support, comes together to bring about a decision. Using the central-battle idea, the concept specified quantitatively the weapons and systems needed to win the next battle, identified and described shortcomings, and set forth measures to redress any imbalances. As part of this effort, TRADOC devised the battlefield development plan (BDP) to

focus, prioritize, and integrate TRADOC efforts in materiel and training developments, force structuring, and concept and doctrine development. Additionally, it presented TRADOC's view on major issues to DA and other agencies, and it recommended action to improve the Army's combat readiness and force modernization program.

TRADOC designated the Commander, LOGC, a functional task force leader for two major BDP tasks: logistical support during the central battle and reconstitution after the central battle or during the period of force regeneration. Selected centers and schools comprised the support team which bolstered the Commander, LOGC, as Task Force Leader.[5]

Restructured General Support (RGS). The division restructuring program gave birth to many other force studies, one of which was the RGS effort.

Originally, the US Army Ordnance Center and School developed the RGS concept as combat oriented general support (COGS) for the Commanding General of the LOGC. The COGS concept evolved from the Chief of Staff of the Army's decisions on echelons above division (EAD) and echelons above division expanded (EAD-X). The reduction of CSS spaces in Europe, the Israeli experience, reduced defense expenditures, and more sophisticated weapons systems, contributed to the development of the COGS study. In early 1976, the Center forwarded the completed COGS study to the Department of the Army; DA approved it for evaluation and implementation planning. The TRADOC Combined Arms Test Activity (TCATA) conducted a field test at Fort Hood, Texas. TRADOC prepared a test plan for this concept in November 1976. On 2 December, the DA directed TRADOC to develop a plan to evaluate it and implement it throughout the Army. The DA assignment had a caveat--a field evaluation of the Armored Combat Vehicle Support Battalion at Fort Hood, which began in March, and was scheduled to end in the fall, 1977. TRADOC assigned the project to the Logistics Center on 20 December 1976.[6] Concurrent with the field test, the USALOGC RGS task force initiated three other facets of the evaluation: the TRADOC Scenario Oriented Recurring Evaluation System, a maintenance and supply simulation model (MASC); and inclusion of the RGS centers at LOGEX 77, a national command post exercise (CPX).7

As part of that effort, the Center completed the evaluation and analysis phase of the RGS study effort in August 1978, and published and distributed the final draft report to DA, MACOMs, and interested agencies for comment. The report indicated the RGS concept would save personnel and equipment, increase operational availability, and hold unit conversion turbulence within the reserve components to an acceptable level. The RGS concept of commodity orienting general support maintenance on company-size building blocks provided an enhanced forward support capability.[8]

Simulation of Restructured General Support. In December 1976, DA tasked the LOGC to evaluate the RGS concept. To conduct this evaluation, the Center selected the Maintenance Support Concepts model; on 22 July 1977, it established an RGS LOGC team to prepare input data for the model. The simulation evaluated the performance of the RGS maintenance system as compared to the TASTA-70 maintenance system in the context of the SCORES V Corps European Scenario.

During FY 77, Operations Analysis Directorate analysts defined model input parameters, made necessary model modifications, and assisted other LOGC directorates in preparing model input data.[9]

During the first quarter of FY 78, the C&D, Materiel and Organization Directorates prepared input data for the MASC model. In addition, the directorates loaded data into the MASC model and accomplished some model corrections/extensions. Model changes were necessary to permit loading of inputs for a corps-sized force based on the scenario.

For RGS purposes, further improvements and corrections during the second quarter were completed on the MASC model. Modifications included development of subroutines for (1) accepting combat damage, (2) referring failures in accordance with operational concepts, and (3) simulating certain times in the transportation aspects of the model more realistically.

The MASC model was applied in a sensitivity analysis of the RGS versus the TASTA-70 maintenance concept. Completed in March 1978, the analysis examined the influence of major parameters on end item operational availability and on maintenance system responsiveness. The analysis indicated the advisability of reexamining the RGS and TASTA-70 input information to assure that the maintenance concepts were properly represented in the model.[10]

Other Major Programs

Modernization Of Logistics - 1977 (MODLOGS-77). Europe's combat forces required improved and rapid support. Unfortunately, there has been a reduction in the ratio of support personnel to combat forces, resulting in a reduction of approximately 50 percent of the support forces since 1969. Each reduction eliminated and consolidated support activities, and led to a less than optimum logistics support posture. This situation necessitated system improvements, which could only be made through a significant restructuring of the logistics support channels. The Modernization of Logistics Program, or MODLOG, was the result.

MODLOG began in September 1975 and operated on the dual premise that US Army, Europe, must recognize that additional resources won't become available in peacetime and, therefore, the command must structure itself to live within its present resources. The three objectives of the MODLOG program were to (1) optimize the logistics structure and operations, (2) increase reliance on the continental United States logistics base, and (3) increase host-nation and contractor support.

LOGC interests focused primarily on the airlift of repair parts (air line of communications-ALOC), extension of standard automatic data processing (ADP) systems (Standard Army Immediate Level System-SAILS), and the establishment of a general support base within the corps.[11]

(1) SAILS. The SAILS AB package was extended into the corps and the 21st Support Command. Dialog continued between DA, TRADOC, USAREUR, and LOGC concerning procedures for establishing the general support capability in the corps and requisite management at the COSCOM.[12] Improved responsive support and increased operational readiness of the combat forces were the program's major benefits.

(2) ALOC-Europe. The formal test period began on 1 January 1977, and ran for nine months. A team visited USAREUR in September 1977 to review the system, procedures, and operations with the end purpose of making a recommendation concerning acceptance of ALOC as a standard system in the distribution of repair parts.[13] The recommendation was approved.

Air Line-of-Communications (ALOC) for Korea. On 30 December 1976, the DA DCSLOG expressed the desire to establish an ALOC from CONUS to Korea for repair parts and other selected high priority items.[14] The LOGC commenced a concept study on 5 January 1977 and, on 14 April 1977, published a draft report.[15] DARCOM, the Defense Logistics Agency (DLA), the Eighth US Army (EUSA), and the Military Airlift Command (MAC), supplied the data. US Army Logistics Management Center (ALMC) provided a person to perform a cost analysis of the concept. LOGC personnel made coordination visits to Sharpe Army Depot, Travis Air Force Base the Logistics Control Activity, and the EUSA in Korea. The DA DCSLOG approved the study on 7 June 1977, after receiving the decision briefing, and directed that a prototype test be conducted in October 1977 and a full-scale test in November 1977.[16] The Chief of Air Force Transportation, USAF, approved the use of Travis AFB as the aerial port of embarkation for the proposed ALOC after the briefing. The LOGC recommended ALOC use the commercial truck from the Sharpe Army Depot container consolidation point to Travis AFB, channel airlift to Osan AFB, and military truck to the consignees. The system required a 5-workday week with an order ship time goal of 29 days versus the 71-plus days now required for surface movement. The cost exceeded $5.25 million annually.

The Presidential decision to withdraw troops from Korea resulted in a follow-on ALOC analysis. On 2 August 1977, HQDA suspended all actions concerning permanent implementation of an ALOC pending the results of a thorough evaluation of the ALOC concept being tested for USAREUR.[17]

Communications Support Requirements (COMSR). COMSR identified all known requirements for tactically deployable units to communicate from point A to point B in a theater of operations, using specific types of communications modes. The COMSR data base required updating and maintaining communication-need lines between identified units.[18] AR 105-9, 8 August 1977, implemented the tactical COMSR program. Originally established to provide a communications baseline for the Integrated Tactical Communications Study COMSR quantified a typical unit's requirement to pass information to another unit. These requirements lent themselves to computer simulation or manipulation, and enabled the communications engineer to design and procure new items of equipment to satisfy the identified requirements. During late FY 78, the Center accomplished two special COMSR reviews:

Conducted in early August 1978, the first review concentrated on the data transmission requirements of units at all echelons of employment from the forward edge of the battle area to the water's edge. The Center identified the data traffic requirements for the logistics community and provided this information to the COMSR technical operations element at Fort Gordon for incorporation into the data base. The input was coordinated with the battlefield automation management plan input and with the LOGC associated schools.

The second special review began in late September 1978 and has a 15 November 1978 completion date. This review updated voice and page traffic requirements at division and corps level.[19]

Reserve Component Advisory Group (RCAG). The Active and Reserve Components both must understand the other's limitations and capabilities in order to effectively develop doctrine and force structure. With the rapid joint employment of Active and Reserve Component forces, a major factor in current defense planning, current and prompt reserve component input to active Army planning was vital. Early assessment of proposed logistics force structure changes included anticipated advantages and disadvantages to both active and RC forces. When anticipating reorganization in the reserve component impact on training, costs, morale, readiness, schooling, mobilization planning, geographical arrangement, implementation process, and equipment distribution were each properly assessed prior to reaching the critical stage.

Created at the direction of the DA, the LOGC RCAG advised the LOGC on the probable impacts on the Reserve Components of developments of logistics doctrine and force structure. The RCAG also identified

NGB/OCAR position early-on in study efforts which could ultimately affect logistics force structure.[20] Membership through 30 September 1978 included the Commander, 167th COSCOM, ALARNG; Commander, 103d COSCOM, USAR; Deputy Chief, Army Reserve; National Guard Advisor to the Deputy Commander for Readiness, DARCOM; and the USAR Advisor to the DCSLOG, DA.[21]

The RCAG convened two meetings during the period 1 April through 30 September 1978. In his report to TRADOC, General Smith praised the senior reserve component personnel who constitute the RCAG, as men "who are both knowledgeable and candid." He found the meetings thus far "mutually beneficial," and noted that future meetings would be held approximately three times a year and he acknowledged the inclusion, at TRADOC insistence, of FORSCOM participation.[22]

Logistics Force Structure Development Policy, Doctrine Planning. The Commanding General, TRADOC, directed his staff (on 14 November 1977) to develop a capability to do force structure trade-offs as new systems come on-line, which require new or changed organizations. A force structuring conference convened on 28 February 1978, with representatives from the integrating centers and schools in attendance.[23] The conference led to new accords on policy and methodology, established a TRADOC force structuring network, and developed the roles and relationships of the various TRADOC organizations related to force structure. On 28 February 1978, the Director of Operations and Administration, LOGC, outlined in general terms the participation expected from the LOGC, and tasked specific directorates to address logistic data requirements.[24] The Chief of Staff, USALOGC, designated the C&D Directorate, on 1 March 1978, as the office of primary responsibility for logistics force structure.[25] Representatives from C&D participated in several logistics working group meetings held at the Concepts and Analysis Agency, Bethesda, Maryland, to review the Army Force Planning Data and Assumptions (AFPDA) document. As a reference document with emphasis on the North Atlantic Treaty Organization AFPDA was widely used by the modeling portion of the force development community, and was the key to the program objective memorandum (POM) development cycle.[26] On 27 March 1978, HQDA and HQ TRADOC prepared a memorandum of understanding which recognized the command's major roles in analyzing and developing the force structure of the US Army. Further, it defined the force structure responsibilities of each headquarters, eliminated duplication, insured common objectives and integrated efforts to contribute to the disciplining of the force structure process.[27]

Reliability Centered Maintenance Strategy (RCMS). RCMS developed materiel maintenance programs based upon technical analysis and equipment evaluation. Historically, maintenance tasks have been accomplished in accordance with upper limits placed on hours or miles of operation or rounds fired. RCMS scheduled maintenance tasks and inspections only when a malfunction impacted adversely upon safety or operational

performance. It focused on the redirection of scheduled maintenance frequency and tasks where it was done effectively and economically without sacrificing the inherent level of reliability.[28]

In a July-August 1977 article of Army Logistician, Maj Gen Eivind H. Johansen wrote that, "reliability-centered maintenance calls for the elimination of time-honored maintenance practices that do nothing more than increase costs without adding to the safety or reliability of an item or system. It's a valid response to the unnecessary and wasted maintenance motions that we've seen being made in the midst of rising maintenance costs."[29]

During FY 78, RCMS concepts included "condition monitoring," "on-condition," and "hard-time" maintenance principles. In April 1978, AR 750-1 incorporated limited RCMS guidance. LOGC participation included the preparation and TRADOC-wide coordination of the draft of DA Pamphlet 750-XX, Guide to Reliability Centered Maintenance for Fielded Systems. This guide provides detailed instructions for incorporation of the RCMS principles into the technical documentation and support doctrine for currently fielded systems. Implementation of the instructions contained in the guide began in May 1978. In addition, the LOGC sent respresentatives to the RCMS steering group meetings, ODCSLOG, DA. These meetings provided overall guidance for continued development and implementation of the principles for both fielded and developmental systems. The LOGC also served as a voting member of the study advisory group (SAG) for the RCMS performed by the Martin Marietta Corporation, under contract DAAG 39-77-C-0169. The study concluded in September 1978; SAG approved it the following month. The final study report offered a comparative analysis of RCMS actions and status within the airline industry and all DOD services. It recommended that a formal DA RCM definition be developed and published along with more comprehensive guidance, instructions, and training. The study also suggested RCMS documentation and audit trends and it further recommended that a comprehensive RCM program for at least one major system in each materiel readiness command be used as a basis for completing these tasks.

Since the emphasis of the RCMS program shifted from the fielded systems to the developmental systems and the Failure Mode and Effects Analysis Failure Detection and Location Analysis as of October 1978, a transfer of LOGC proponency for the RCMS program was coordinated between the Materiel Directorate and the Concepts and Doctrine Directorate.[30]

Studies and Analyses

Authorized Stockage List (ASL) Mobility Study. The LOGC undertook the ASL mobility study to determine the actions required to provide the needed mobility for C1 IX authorized stockage list (C1 IX) items in armored, infantry, and mechanized infantry divisions.[31] Employment of the division in combat involved displacements of major maneuver elements which, in turn, required relocation of DS elements so that they remained reasonably close to the units they supported. Reports and on-site visits indicated that divisional maintenance battalions lacked sufficient mobility to provide adequate support in a combat situation. Commanders were concerned about continuing logistic support during combat operations. During this period, divisional direct support units (DSU) lacked sufficient organic vehicles to store and haul their C1 IX ASL. Although not authorized in the TOE, MILVANs filled this need. When used for this purpose, the MILVAN has a number of drawbacks: there were no interior lights; ventilation was poor; and maintenance units had to fabricate the required bins. There was also the attendant requirement for prime movers when trailers were added to the division.

The study concluded that the forward DSU should be 100 percent mobile and capable of moving within 3 to 4 hours. Forward DSU should also have the capability of displacing 80 percent of their C1 IX items within 30 minutes and be able to resume operations shortly after arrival at the new position. The remaining 20 percent should be recovered within 3 to 4 hours.

Additionally, the headquarters and light maintenance company and other rear elements of the maintenance battalion needed a 50 percent mobility capability and must be able to move by echelon. Furthermore, binnable repair parts must be "on wheels" (trucks, trailers, vans, MILVANs) at all times.

Finally, the study concluded that in order to satisfy immediate mobility requirements, the following additional equipment and personnel should be allocated to divisional maintenance battalions to store and haul C1 IX ASL items:

	77 Inf	78 Inf	77 Mech	78 Mech	77 Armor	78 Armor
Type Veh						
MILVAN w/chassis	41	26	41	26	41	26
S&P Trlrs	13	13	16	16	16	16
Tractors	42	32	42	31	42	34
Personnel						
Mech/Rpmn	7	6	10	9	8	6
Drivers	17	12	18	12	18	12
TOTAL	24	18	28	21	26	18

Figure 19. Division Maintenance Battlion

The Center forwarded the completed study to TRADOC and HQDA for approval on 15 March 1978. ODCSLOG, DA, concurred with and approved the revised ASL Mobility study (with incorporation of minor changes) on 23 May 1978. At the close of the periods, MACOMs were in the process of requesting approved MILVANs and other equipment.[32]

Direct Support Unit (DSU) Combat Authorized Stockage List (ASL) Range Policy

On 24 July 1978, ODCSLOG, DA, tasked the LOGC to develop, document, evaluate, and field a DSU combat ASL range policy. The proposed policy provided a mechanism for separating ASLs into combat essential, safety/legal, and nonessential segments based on the Army master data file (AMDF) essentiality codes; established variable add and retain criteria for the aviation, missile, and common commodities as identified by the AMDF materiel category codes; based the variable criteria on an individual DSU 12-month demand history; prescribed a procedure for periodically updating the criteria to recognize changes in the individual DSU's demand pattern over time; and, finally, assisted the commander in ASL management by means of an automated identification of these various elements of the ASL.[33]

ODCSLOG, DA, FORSCOM, USAREUR, and the LOGC scheduled an evaluation for the first half of CY 1979. Presentation of a coordinated draft revision of AR 710-1 and a systems change request (SCR) for the Direct Support Unit Standard System (DS4) were scheduled for FY 79.[34]

General Support (GS) Base Expanded. Commensurate with the Army's "Implementation of Logistics Concepts for Use in Policy, Planning, Doctrine and Training," actions occurred which deployed three GS repair parts companies forward and established corps level combat authorized stockage lists for support of anticipated wartime consumption rates for repair parts within USAREUR.

On 15 June 1978, CINCUSAREUR proposed that the ASLs should consist of two major segments:

(1) A combat ASL segment of from 6 to 7,000 lines established for 30 days of supply based on anticipated wartime consumption rates. This ASL segment provided backup support only for combat essential repair parts that were stocked at a 45-day level at the DS and parts stocked at the organizational level.

(2) A demand-supported ASL segment of 3 to 7,000 lines based on an aggregate of all issue priority designator 01 to 08 equivalent demands from all supported DS units. The depth of this ASL segment was relatively shallow (a minimum stockage of two each per item, a maximum stockage based on IPD 01 to 08 demands) since they supported only peacetime readiness and not wartime sustainability.

The LOGC concurred with this proposal in August 1978. Also, CINCUSAREUR identified sources for consideration in establishing the range and depth of the expanded GS base ASLs which included the FM 42 series, Wartime Repair Parts Consumption Planning Guides, and the DARCOM Commodity Command Standard System Provisioning Master Data Record Wartime failure factors.

The "Implementation of Logistics Concepts for Use in Policy, Planning, Doctrine and Training" requires that a portion (approximately 10 days) of the theater level class IX war reserves established in accordance with AR 11-11, be distributed to GS base locations. These bases physically held and maintained the assets, but control and accountability remained a theater-army responsibility. As part of the Development of the Communications Zone project, ODCSLOG, DA established taskings during FY 79-1.[35]

Reserve Forces Structure. The reserve forces structure continued as an umbrella-type consulting service created by the Commander, LOGC, with the concurrence of the Commanding General, FORSCOM; it provided logistics expertise in deliberations involving organization and assignment of reserve component units. The principal activity involved development by the LOGC of the COSCOM Roundout Concept. This plan created two full Corps Support Commands (COSCOMs) in the reserve components and developed four COSCOM-minus organizations in the reserve components to roundout

active component COSCOMs. The proposal to "roundout" active duty corps support commands suggested application of para 3a, AR 1-29, Affiliation Program, to logistics units as well as maneuver units. The proposal took on increasing credibility when it's understood that COSCOMs on active duty have less than 25% of the units required for wartime mobilization; and approximately 65% of the logistics units in the total force remained in the reserve components.

USAREUR and the active duty COSCOMs approved the basic concept in mid-1975, and it has been scrutinized ever since. As principal proponent for the COSCOM roundout, FORSCOM accepted the LOGC recommendation concerning full COSCOMs, and created the 167th COSCOM in the Alabama National Guard, and the 103d COSCOM in Des Moines, Iowa. On 9 and 10 June 1978, in its role of consultant, the LOGC hosted a two-day General Officer's workshop on the COSCOM Roundout ADCSLOG, DA, chaired the workshop, with 12 general officers from active and reserve components in attendance.[36]

Maximize Utilization of Container Systems. As a LOGC major program objective (MPO), this action involved management of all LOGC actions or activities to maximize the use of container systems. The actions included development or publication of concepts and doctrine, related organizational revisions, materiel acquisition, training, and evaluation and testing. In conjunction with other commands and activities, the program's objective requires a fully functional container distribution system for the Army. In February 1977, DA reviewed the August 1975 charter for the major program objective coordinator. In a memorandum signed by the LOGC Deputy Commander (BG Vuley), "Containerization" left the list of LOGC MPOs in August 1977. The memorandum stated that "the main objectives in establishing this MPO have been met, and LOGC work efforts in the container area no longer require this highly centralized management effort." Progress occurred in all areas; however, the Army remains far short of fielding a fully functionally container distribution system.[37]

Numerous gaps and voids existed in the development and publication of needed doctrine. Dogma for the operations of supply units (DSUs/GSUs) in a container-oriented distribution system and maintenance doctrine for support of a capability design specification have neither been developed nor published.

TOE revisions for transportation and supply units were stalled by failure to type classify essential container-related equipment. Changing concepts and doctrine and advancing technology necessitated periodic reviews or revisions of the basis of issue plan.[38]

Materiel acquisition was well advanced for some essential items, and actions were in progress generally to procure needed container handling and transport equipment as rapidly as possible, subject to budget

limitations. However, as indicated above, only one item of essential materials handling equipment (MHE), the mobile loading ramp, has been type classified to date. Additionally, doctrinal refinements and advancing technology required periodic reviews and adjustments in approved required operational capabilities (ROCs) and their specifications. For several container-related items, which could be essential to a CDS, ROCs have yet to be processed and approved by HQDA.

The programs of instruction (POI) of all LOGC associated schools included some containerization training. Except for the Transportation School and certain stuffing and unstuffing classes at the QM School, most training remained at the orientation or familiarization level. More advanced training awaited further doctrinal developments and equipment availability.[39]

The successful completion of the joint logistics over the shore operations (LOTS) preliminary tests during 1976 and the joint LOTS main test during July and August 1977, represented major accomplishments in the development of capabilities to discharge containerships in a LOTS environment.[40] These tests provided indispensable insights into strengths and weaknesses of operational concepts, equipment, and procedures to accomplish the LOTS mission which was the first "crunch point" in the successful operation of a CDS in a theater of operations; i.e., discharging the containerships and getting the containers over the shore and into a marshaling area. Apart from control requirements and environmental hazards which may attend the movement of containers from coastal areas to inland destinations, the next "crunch point" in the CDS involved the receipt, handling, and temporary storage of containers at GSUs or DSUs. Tests need to be accomplished on the capability of supply units to function effectively when a large percentage of resupply is received in 20- to 40-foot containers. While the operations of all GS and DS supply units were affected by a CDS, the most critical early testing operation involved the ammunition supply units which emerged as a result of the COSSA and MS3 studies.

Containerized Shipment and Storage of Ammunition (COSSA). Over the course of the past decade, economic factors caused the merchant marine industry to convert from breakbulk cargo ships to containerships. This shift compelled the Department of Defense to re-examine support programs for deployed forces and projected contingencies, because future contingencies of any magnitude undoubtedly require the use of commercial containers and containerships. Most defense commodities were already being transported in this manner, and logistics capabilities included a container distribution system for ammunition.

The LOGC COSSA Study provided logistics doctrine and operational procedures for the use of both Government-owned and commercial containers

for direct delivery and en route storage of conventional ammunition and missiles. As a combat developments study, COSSA addressed receipt, storage, and issue problems in a theater of operations using containers that needed ANSI and ISO (American National Standards Institute and International Organization for Standardization) standards as a principal means of transportation during the time period 1976-1986.[41]

Under COSSA-doctrine, ammunition containers entered a theater of operations through established ports or by LOTS operations. Considering the hazardous nature of the cargo, ammunition containers moved to a staging area established a safe distance from the port. Ammunition supply points (ASP) were located just to the rear of supported divisions or within the division rear area and received priority containers. Ammunition containers not required for immediate throughput shipment to ASPs were delivered to Corps Storage Areas (CSA), located in the Corps Rear Area. The CSA was the primary storage location for reserve stocks.[42]

The Office of the ASA approved the DA-directed, LOGC-developed COSSA study on 27 October 1977. Publication and distribution followed soon thereafter. Implementation allowed containerized shipments of ammunition to routinely move forward to corps storage areas and ammunition supply points.[43]

In summary, the COSSA Study provided the doctrinal basis for a containerized ammunition distribution system that allowed for the routine movement and storage of class V in a theater of operations.[44]

Special Analysis of Standard Tactical Wheeled Vehicle Requirements (Tactical Vehicles) (TACV). This study identified those vehicles from a list of candidates that best satisfied future requirements for TACV. Originally, the study tried to determine the users requirements for TACV which were approved at the initial SAG meeting held at Fort Lee, Virginia, on 11 January 1977. The HQDA Deputy Chief of Staff for Research, Development and Acquisition redirected the study to provide results that could be used to resolve the program objective memorandum issues that currently exist between the Army and the Office of the Secretary of Defense. This study was integrated into a comprehensive tactical wheeled vehicle program which represented a joint TRADOC-DARCOM effort. DARCOM has lead-command responsibility.[45]

Special Analysis of Standard Tactical Wheeled Vehicle Requirements Excursion (TACV-EX). As an offshoot of the TACV study, the TACV-EX study got underway on 9 Sep 1977.[46] The study sought to determine which vehicle, from a number of candidates, should replace the current 1/2-ton

truck in the tactical vehicle fleet. As part of the Comprehensive Tactical Wheeled Vehicle Program which involved DARCOM and TRADOC as the principals, the study received advise from a general officer-level study advisory group which included representatives from OSD, DA staff, DARCOM, and TRADOC. The SAG first met on 14 November 1977 and approved the TACV-EX study plan at that time. The completed TACV-EX study reached the Commander, USALOGC, on 16 February 1978 and the SAG on 2 March 1978.[47] They recommended the product-improved version of the current 2 1/2-ton truck as the replacement vehicle. TRADOC received the final draft report in April 1978.

CONUS Installation Logistics Support (COILS) Study

During the first US Army Logistics Center Advisory Board meeting, LTG Kornet, Deputy Chief of Staff for Logistics, identified a need for an in-depth study of CONUS installation logistics. Discussions during subsequent LOGCABs revealed that senior Army logisticians universally agreed that guidance appeared to be lacking regarding operations and missions of CONUS installation logistics. Initial research into the area of CONUS installation logistics uncovered a definite void for indoctrination of military personnel being assigned to Director of Industrial Operations (DIO) positions at CONUS installations. In order to improve this condition, the US Army Logistics Management Center initiated a 3-week course of instruction. This course indoctrinated personnel assigned to or associated with the DIO position.

The COILS study effort involved various approaches. Preliminary analysis of CONUS installation logistics indicated such an operation to be a highly complex area due to direct interface with associated functions such as funding, procurement, personnel, CITF, contracting, and ADP systems. For this reason and due to personnel constraints, coverage was limited to the transportation, maintenance, supply and services areas. However, due to transfer of responsibility for commissary operations from the MACOMs to the US Army Troop Support Agency, the COILS Study Advisory Group deferred the services substudy. Field visits to some DARCOM installations were scheduled in order that base support logistics operations could be evaluated for possible application at TRADOC and FORSCOM installations.[48]

The CONUS Installation Logistics Support Study examined CONUS installation logistical support operations to determine problem areas or identify areas which required doctrinal, regulatory, staffing, training, and organizational structure changes for increased effectiveness in accomplishing the installation logistics support mission. The examination of installation support operations included submission of separate questionnaires in the areas of supply, maintenance, and transportation

to 29 CONUS installations. Moreover, the COILS Study Team conducted seven field visits to four FORSCOM, one TRADOC and two DARCOM installations. The supply substudy members visited one additional TRADOC installation and two DARCOM installations for a total of eight installations visited. Data obtained from the questionnaires and field visits was carefully evaluated and provided the basis for recommended changes. The final study report proposed changes in the functional areas of supply, maintenance, and transportation. The final report was disseminated in June 1977.[49]

Rationalization, Standardization, and Interoperability (RSI). In October 1977, TRADOC tasked the LOGC not only to participate in the United States and German (US/GE) Army Staff talks but also to further logistics interoperability. This tasking combined with the recognized need to expand existing doctrine to include considerations for logistics RSI caused the LOGC to establish the International, Rationalization, Standardization, and Interoperability Office (IRSIO) in the C&D Directorate. Since its establishment, the IRSIO and other elements of C&D have participated in these proceedings.[50]

Colonel H. W. Lacquement, at that time, Chief, Functional Logistics Division, became the LOGC point of contact for the US/GE Army Staff talks and attended Staff Talks held at Monterey, California, in November 1977, and Staff Talks V, at Hannover, Germany, in June 1978. Talks revealed that the German Army logistics staff desired to include logistics interoperability initiatives in the US/GE Army Staff talks only when specific issues needed to be elevated to the highest level. The German Army logistics staff lacked manpower resources to duplicate logistics RSI initiatives being addressed in other forms. The LOGC proposed that a logistics interoperability handbook be developed. The German Army accepted the proposal and promised to submit their formal comments during FY 79.[51]

The LOGC did not participate in US/GE Logistics Joint Chief of Staff level talks. DA DCSLOG was the US representative. Doctrinal matters were referred to the US/GE Army Staff talks or to TRADOC for resolution. The LOGC monitored the conduct of these talks through information provided by the DA DCSLOG staff.

As part of the RSI effort, the LOGC accepted membership in the America, Britain, Canada, and Australia Quadripartite Working Group-Logistics. The Logistics Evaluation Agency (LEA) was the US proponent.

DARCOM hosted a conference on US Army International Programs and Foreign Equipment Buys, on 7 December 1977. In November, the LOGC participated in the Logistics Work Group meetings to prepare logistics

presentations to be given at this conference. The conference resulted in a Department of the Army RSI Management Plan. Implementation instructions are anticipated during FY 1979.[52]

Munitions Systems Support Structure (MS3). The Munitions System Support Structure (MS3) study (dated April 1978) established the conceptual basis to support ammunition supply in the emerging logistics system (less chemical special ammunition and NATO nuclear special ammunition support) and new tactical doctrine for the 1976-1980 timeframe. This Logistics Center-directed study provided the first look since 1965 at the munitions support structure from a systems standpoint. TRADOC returned the MS3 study to the LOGC on 14 December 1977 for restructuring. TRADOC specifically requested a reorganization of the presentation of the study and its results keying on the advantages of the recommendation to modernize the ammunition support structure and system. The US Army Missile and Munitions Center and School received the study on 27 December 1977 to initiate revisions as recommended. They completed this revised study during FY 78-3 and submitted it through TRADOC (FY 78-4) to DA for final approval.[53]

The LOGC undertook an extended study effort (MS3-X) to determine the adequacy of the MS3 structure to support developments that will occur in the period 1981-1989. New force structures were examined for the 1981-1989 timeframe and the MS3 structures refined to support the total force structure and the Army ammunition plan. Conceptual organizations and structure were developed for NATO special weapons support, support of other US armed forces, and chemical munitions support. An assessment of the total transportation (to include helicopter resupply of ammunition), communications, security, and management information system (Standard Army Ammunition System) requirements was undertaken. Involved were the MS3 TOE series and the Theater Army Area Command (TAACOM)/COSCOM, and divisional TOE units that have munitions resupply responsibilities.[54]

Development of a Battlefield Recovery Concept. TRADOC approved the study plan for the development of a battlefield recovery concept on 15 March 1978. Subsequently, the Center revised the plan and is now conducting it in two phases. Phase I covered tracked vehicle recovery and evacuation, and Phase II covered wheeled vehicle recovery and evacuation. The findings of this effort impacted on the doctrine, organizations, and equipment requirements being developed in the Division 86 study.[55]

Improved Maintenance Concept for Lead-Acid Batteries. The USALOGC developed feeder data for an improved maintenance concept for lead-acid batteries. This feeder data reached HQDA on 20 April 1978. On 22 June

1978, Mr. R. Biggs, Assistant Director for Maintenance Management, ODCSLOG, DA, wrote to General Smith requesting an additional evaluation of the lead-acid battery maintenance problem. A JWG, composed of representatives from HQ, USALEA, USADARCOM Materiel Readiness Support Activity (MRSA), USAOCC&S, USALOGC, US Army Equipment Authorization Review Activity (USAEARA), USAFORSCOM, US Army Tank-Automotive Readiness Command (USATARCOM), and US Army Communications-Electronics Materiel Readiness Command (USACERCOM), scheduled its final conference at the LOGC during FY 79-1. As part of this effort, the Center directed the Ordnance and Chemical Center and School to develop input for personnel and equipment requirements.[56]

Development of a Maintenance Concept for Nickel-Cadmium (NICAD) Batteries. On 5 December 1977, HQ TRADOC instructed the LOGC to develop a doctrinal and organizational concept for the storage, charging, and maintenance of NICAD batteries. As a first step, the Center surveyed active Army divisions and the Communications-Electronics Readiness Command. The survey revealed that the Army Supply system contains 38 models of NICAD batteries and 22 chargers for these batteries. Comments revealed that present chargers are largely inadequate. On 12-13 September 1978, the LOGC chaired a joint working group meeting to develop a nickel-cadmium battery maintenance concept. DARCOM decided to try PP-7286 as the universal charger. The total support requirements for a maneuver battalion included:

(1) One each S-250 shelter w/heater, fan, lights, and wiring.

(2) Ten each battery chargers, PP-7286.

(3) One each battery analyzer (to be developed).

(4) One each generator set, PU-620M LIN J47617 consisting of two each 5KW generators on trailer, M116.

(5) One each truck 4x4, 1 1/4-ton.

(6) Two dedicated persons.

One additional station of this type should be in the brigade trains area to provide backup charging capability. The Center promised the proposal to DA ODCSLOG in April 1979 for approval and validation with selected direct support units.[57]

Special Analysis of Equipment Transporter Requirements (Heavy Equipment Transporter) (HET). The HET study identified current doctrine for HET employment, developed a concept for future employment of the HET, and determined the type and quantity of equipment transporter requirements. From February through April 1977, the LOGC analyzed CACDA war gaming

data within the framework of conceptual employment for equipment transporters, and briefed the results to the LOGC Commander in May 1977. With his approval, the study draft was prepared and distributed in October 1977, for Army-wide coordination.[58]

Center representatives briefed the HET study to the TRADOC Commander on 1 March 1978, including USAREUR requirements for the use of HETs in Europe to support the tactical movements of tanks. The TRADOC Commander agreed with the HET requirement developed by the study, and instructed CACDA to reexamine their previously stated position that there was no requirement for the use of HETs to support tactical movements. CACDA responded in June 1978; they concurred with the USAREUR position that there was a requirement for the use of HETs to support tactical movements of tanks. The Center revised the study accordingly and sent the final draft to TRADOC in August 1978. "The study recommends that the number of currently authorized HETs be increased by approximately 40 percent through 1983," wrote the LOGC Commander, "and that a new or modified semitrailer be acquired so that two of the fighting vehicles now under development can be transported in one lift."[59]

Phase II--Logistics Operations in the Communications Zone. The Phase II study began on 10 January 1977 and concluded with a published report on 24 August 1977. The initial efforts refined and narrowed the multitude of objectives and essential elements of analysis contained within the study directive. The issues included such diverse areas as size, composition, and structure of the general support base in the corps and the communications zone (COMMZ), theater army area command versus USAREUR GS command, management of war reserves, wholesale systems role in the COMMZ, theater commander's role in a multinational environment, and type of logistics support to be provided by host nations.

The study involved visits to several commands, including the LOGC, as well as special general officers meetings, including a presentation by the study group to the Select Committee. Based upon the vast scope of the study and the wide range of implications during the presentation, the Vice Chief of Staff directed that a "horse blanket" (spread sheet) be prepared laying out the study in terms of issues, group findings (concepts), near and long-term actions, and responsible agencies. The "horse blanket" was coordinated with TRADOC and LOGC in July 1977, with concurrence reached on 18 of 22 concepts (in principle) expressed by the study group. Issues concerning the corps or COMMZ GS base and the GS command remained unresolved. The resolution of these issues was predicated on the results of the RGS test conducted at Fort Hood, Texas.[60]

The DA approved the 21 concepts generated by the Phase II study on 30 May 1978. These concepts provided a basis for future logistics policy planning, doctrine, and training actions. Concepts 1 through 5 related to the size and composition of the GS base in the corps; 6 through 11

dealt with the size and composition of the GS base in the COMMZ; 12 through 14 related to the management of the theater war reserves; 15 through 21 covered the role of the wholesaler in the theater of operations. The Phase II study has been terminated. Efforts directed toward the study continued under the task of "Concepts for Logistics Planning Doctrine Policy and Training." Actions related to the 21 concepts for logistics planning, policy, doctrine, and training provided for the implementation of the concepts into Army logistics doctrine over the next few years.[61]

Rear Area Protection (RAP)

The Logistics Center assumed staff and integrating responsibility for rear area protection matters by Memorandum of Agreement with the Combat Developments Center, 14 May 1974. The Directorate for Combat Developments, US Army Military Police School (USAMPS) sponsored and performed the Rear Area Protection Study. The USAMPS forwarded the study to the LOGC for comments. The primary points of disagreement between the USAMPS and the LOGC were mission responsibility for RAP and the assignment of the rear area operations center in the corps rear area. The Center proposed that the COSCOM retain RAP responsibility and have assigned a Rear Area Operations Center (RAOC); USAMPS accepted this proposal.[62]

The Commander, TRADOC, approved the development of a new study on Rear Area Security (RAS) and RAP to be started in October 1977. In a letter, dated 18 October 1977, the Combined Arms Center assumed the role as integrating center having responsibility for RAS and RAP doctrine and concept development. The USAMPS forwarded a draft of the RAS and RAP concept to CAC on 7 December 1977 for comments and recommendations. The USAMPS prepared a revised concept, incorporating the CAC recommendations. On 7 March 1978, USAMPS tasked the USALOGC and associated USAMPS to review and comment on the revised concept.[63]

On 28 April, the USALOGC sent the results of its coordination to the USAMPS. The study had an October 1978 completion date.[64]

Rear Area Combat Operations (RACO). During the report period, the LOGC provided extensive support to the USAMPS RACO study. On 8 May 1978, the LOGC forwarded a TOE spread sheet of CSS units from the Europe I Sequence 2A troop list; the capability of proponent CSS TOE units to defend themselves without halting their primary mission or calling for support from combat units; some adjustments in doctrine, organization, and materiel which would be made to improve the self-defense and rear area security capabilities of proponent units; and information on emerging doctrinal changes in logistics operations which would impact on rear area security requirements in the corps area.

On or about 15 June 1978, the LOGC forwarded the Europe Short Warning and Europe 2A SCORES scenario deployment overlays, validated the disposition of troops in accordance with current echelons above division (EAD) doctrine, and provided updated overlays to the USAMPS. On 5 September 1978, the CAC tasked the LOGC, ADMINCEN, MP School, Engineer School, and Signal School to initiate research in the applicability of high mobility weapons carrier and Mark 19 for organic defense within the capabilities of their proponent TOEs. There was no suspense on this action, but following an immediate review of the subject CAC was informed by message, 15 September 1978, that a reply was dependent upon a coordinated addressee understanding of the mission of CS and CSS units in the active defense and type evaluation to be performed, including guidance, parameters, and essential elements of information. On 26 September 1978, a message was received from CAC announcing a meeting at the MP School, on 11 October 1978, for the purpose of receiving guidance, a statement of need, and a systems definition.[65]

Combat Systems Rearm/Refuel in Battalions (COSRRIB). The COSRRIB study evaluated current organizations, doctrine, and equipment employed to rearm or refuel principal weapons systems of tank, mechanized infantry, and artillery battalions operating in the forward area of battle and developed a proposed concept that would optimize rearming and refueling of these units during intense conflict. On 5 October 1976, the LOGC forwarded the final report of the COSRRIB study to TRADOC for approval. The study recommended development of an armored forward area rearm vehicle (AFARV) to carry ammunition resupply to combat units forward of the brigade trains. The study did not recommend development of an armored forward area refuel vehicle (current policy and doctrine is adequate). On 31 January 1977, the Center sent a draft proposed letter of agreement (DPLOA) to TRADOC, recommending the development of an armored combat logistics support vehicle family (ACLSVF) and the suggested development of an armored forward maintenance assistance vehicle (MAV), and the hardened and improved medical evacuation vehicle (MEV). HQ TRADOC approved the COSRRIB study as a concept proposal, on 17 February 1977, and suggested that a concept evaluation program (CEP) be performed. Evaluation under a CEP gave TRADOC sufficient data for more detailed analysis of the COSRRIB study recommendations. On 28 March 1977, due to restructuring the revision of the format and information contained in the letter of agreement by TRADOC, the LOGC resubmitted the LOA for the ACLSVF. On 27 September 1977, the TRADOC CG changed the focus of a ACLSVF DPLOA from total package covering the AFARV, MAV, and MEV to a DPLOA for each individual system. As a result, a DPLOA was prepared for each proposed end item which stood alone when requesting funding and requirements determination.[66]

The concept evaluation program for the ammunition forward area rearm vehicle began at Fort Knox, Kentucky, on 10 October 1977 and finished 18 March 1978. The CEP examined a variety of M113A1 vehicles configured to resupply combat vehicles (for example: tanks, armored personnel carriers, and M551s) in the covering force and main battle areas. The CEP provided data to assist in determining the type of vehicle which could best serve as an interim ammunition resupply vehicle. In January 1978, TRADOC approved the letter of agreement for the AFARV, the maintenance assistance vehicle, and the medical evacuation vehicle and forwarded it to DARCOM, which pursued the technological avenues to find a vehicle that could meet the desired requirements for possible introduction into the Army inventory.[67]

The Center obtained the report of the concept evaluation program for the armored forward area rearm vehicle during July 1978. The CEP was conducted to evaluate the concept of forward area rearming of combat vehicles and also to provide the opportunity to assess the best interim method of performing the task. Results of the CEP indicated that the concept was possible and the M1134 "stretch" furnished the most lucrative compatibility of an interim AFARV. TRADOC received the proponent evaluation of the AFARV CEP report on 15 September 1978.[68]

Maintenance Concept for the Support of Tactical Signal Intelligence and Electronic Warfare (SIGINT/EW) Systems (Post-1980). This project developed a concept of maintenance for the SIGINT/EW system scheduled to be fielded during the post-1980 period. During the second and third quarters FY 77, personnel from the Concepts and Doctrine and the Evaluation and Test Directorates participated with the TRADOC Combat Arms Test Activity in preparing for and testing the combat electronic warfare and intelligence battalion organization and operations concept. The evaluation ended 30 March 1977, and the final test report went public in July 1977. Based on the conclusions and recommendations contained in the approved report, work started on developing a proposed concept of maintenance.[69]

DA approved the concept paper for the SIGINT/EW maintenance concept on 22 August 1978. This new doctrine was scheduled to be included in new or revised FMs, TMs, TOEs, programs of instruction, soldiers' manuals, and other DA publications, and to be in the field before 1980.[70]

Support Squadron, Armored Cavalry Regiment (ACR). As reported in LOGCAB VIII, the LOGC fashioned a study to develop a responsive support squadron for the Armored Cavalry Regiment, a significant combat element on the modern battlefield. The support squadron departed significantly from current doctrine and permited a significant increase in the combat effectiveness of the regiment by providing the commander with an extensive

organized support capability. Originally, as an organic element, this support squadron provided direct support, supply, maintenance, and transportation to the regiment. Medical and administrative services were added to the concept during the February 1977 meeting.

During FY 77, the LOGC support squadron concept of employment and organizational structure underwent intensive scrutiny by USAREUR, FORSCOM, the US Army Armor Center (USAARMC), and the LOGC associated schools. TRADOC, the LOGC, and the USAARMC agreed that the support squadron of the ACR would obtain ammunition from the corps ammunition supply point and provide supply point distribution to the combat squadrons. This resolution cleared the way for development of the final draft of the proposed support squadron. Starting in December 1976, the Evaluation and Test Directorate (E&T), LOGC, evaluated the support concept using sequence 2A of the TRADOC European Scenario; the evaluation ended on 4 April 1977. Based upon coordination comments from the field and results of the war gaming, final changes were made to the support squadron manning table and equipment list (MTEL); these were forwarded to TRADOC on 20 April 1977. TRADOC sent the support squadron MTEL to HQDA for approval. With the study effort completed, the LOGC remained an active participant in the DA and TRADOC staffing effort.[71]

Bulk Petroleum Distribution. The Quartermaster School performed a DA-sponsored study on Bulk Petroleum Fuels Distribution in a Theater of Operations. The study determined the adequacy of the current doctrine, organization, equipment, and management procedures required for petroleum storage and distribution within the theater of operations. This study concluded that while the basic principles applicable to fuel distribution remain valid, several doctrinal problems needed resolving. The implementation of the echelons above division - extended doctrine, the concept of host nation support for petroleum operations, the petroleum support requirements for an undeveloped theater, and the doctrine concerning estimating fuel consumption in wartime. The study recommendations focused on the modification of current petroleum organizations and the revision of publications to reflect solution to the study findings and emphasis on higher priority for RDT&E, standardization, and utilization of petroleum related equipment.[72]

The Vice Chief of Staff, US Army approved the study recommendations on 23 June 1978. The ODCSLOG (DALO-TSE) established a program advisory group and distributed an implementation plan to major commands and operating agencies. The plan provided a summary of tasking actions to be accomplished by major commands. TRADOC directed the LOGC by a 13 July 1978 letter to accomplish those tasks assigned to TRADOC.[73]

As the proponent agency, the QMS took responsibility on 15 August 1978 to accomplish the necessary actions to implement the study recommendations. However, the LOGC retained responsibility for revising the

required multifunctional publications. The implementation program's milestones extended over a 27-month period.[74]

Division Logistics Organization Structure (DLOS). DA DCSLOG initiated the DLOS study. Subsequently, TRADOC tasked the LOGC to establish and chair the study advisory group. After the last SAG meeting, the Center forwarded the final study draft to TRADOC; TRADOC approved and sent it on to DA. The study determined the desirability and potential resource savings possible through reorganization or elimination of division support command elements. Of the 12 alternative organizations developed, the scenario oriented recurring evaluation system process evaluated three. The final study recommendations included adding 22 persons to the DISCOM headquarters; however, the study realized an overall savings of 383 persons in a 16-division force within DISCOM. Several study recommendations were approved and implemented. In August 1977, DA approved the concept, but withheld implementation pending decisions or results of the division restructuring study (DRS). The recommendations were incorporated into the DRS.[75]

Intransit Asset Visibility to Division Level. The study on intransit asset visibility to division level developed an automated system concept to provide visibility of all cargo coming into, through, and out of a theater by water, air, rail, highway, and container. Using the existing supply and transportation systems plus the intransit asset visibility and intransit cargo files at theater army level, the system allowed commanders the visibility of cargo moving from: (a) within a theater, (b) CONUS to a theater, and (c) theater to theater or theater to CONUS. Commanders managed active logistics assets in support of combat forces and, thus, influenced the battle by diverting, holding, and frustrating shipments. Through interfaces, commanders received supply or transportation status by inquiry through existing supply and transportation channels. The logistics intelligence file received the data and provided feedback to the emerging DOD intransit item visibility system when operational. The Center forwarded the final report on 9 May 1977, to TRADOC. On 24 May 1977, HQ TRADOC approved the study conclusions and recommendations, and forwarded the final report to HQDA (DCSLOG) for approval.[76]

Transportation Aircraft Supply Support Structure (TAS3). The LOGC directed the TAS3 study and the Transportation School completed it. The study examined the supply and maintenance support structure for Army aircraft, aircraft systems components, and aviation unique-managed items of equipment. It recommended that a commodity-oriented aviation support organization be established in the corps support command and in the theater army area command. The new structure provided maintenance and supply support to the divisional and nondivisional aviation assets in the theater of operations. This study was completed and presented to

the LOGC, and approved as a basis for the restructured general support aviation maintenance structure organization and its implementation.[77]

Armored-Infantry-Mechanized (AIM) Division Materiel Management Center (DMMC). The DMMC began in the Combat Development Command with the maturation of a centralized supply and maintenance management activity for the division support command. This occurrence was prompted by concern that the existing DISCOM logistics organization structure might not be compatible with the automatic data processing equipment capabilities of the CS3. To form the DMMC, personnel came from the existing elements of the divisional supply and service or supply and transport battalion, the maintenance battalion, and elements of the DISCOM headquarters staff. The MMC provided a single interface with the corps support command MMC and relieved the DISCOM subordinate battalions of much of the administrative and management functions allowing them to concentrate on the operational aspects of their mission. The ADP facility, acting as the division data center, dealt with a single logistics activity rather than three. During the period January through June 1977, TCATA evaluated three of the AIM divisional DMMCs. The results of the evaluation were reviewed by an independent evaluation review committee chaired by the Evaluation and Test Directorate. The evaluation validated the organizational spaces for each of the DMMC elements and recommended the baseline for the AIM division MMC TOE. The final report was published in FY 78.

In a separate, but related, action, TCATA tested three Division Materiel Management Centers during Jan-Jun 77: The 1st Cavalry with 172 personnel, 2d Armored with 192 personnel, and 4th Infantry with 142 personnel. TCATA compared them to determine if the LOGC-developed baseline TOE of 142 personnel was sufficiently staffed to accomplish the materiel mission of the DMMC. The Center performed an independent evaluation review of the test results and completed the initial draft in December 1977.[78]

Division Level Data Entry Device (DLDED). This project provided a concept for a DLDED for administration and logistical data. This device used a magnetic medium to record or post data and eliminated the cumbersome punched cards currently utilized. The DLDED requirement followed the source data automation study. During FY 77, this program concentrated on the formulation of a draft letter requirement for the device. The letter was staffed for worldwide coordination. Field comments indicated a requirement for such a device and requested that it be fielded as soon as practical.[79]

Comparative US and Soviet Tactical Logistics. On 7 February 1978, the LOGC received instructions to develop and present a briefing to the Under Secretary of the Army on comparative US/Soviet tactical logistics at the division level. The blue and red briefing discussed current

division level logistics doctrine, structure, and capability. The LOGC discussion centered on US and Soviet division tactics, in the development of the accompanying support structure. The briefing covered the organizational structure of a current US Armored Division (people, equipment, and weapons); the operational concept (current how-to-fight doctrine); logistical support concept (organization of DISCOM, FASCO concept, and current doctrine on how to arm, fuel, fix, and feed); comparison of key classes of supply (Classes I, III, V, and IX); automation within the division (MMC and DLOGS); and a brief summary of key differences, as related to division level logistics.[80]

The Assistant Chief of Staff for Intelligence DA, prepared the red (Soviet) portion of the 16 March 1978 briefing, and Dr. Walter LaBerge, Undersecretary of the Army, was the main recipient. The briefing attempted to answer the question, "Why does a US division have more personnel in its maintenance battalion (1044) than a Russian tank division's maintenance battalion (256) when the number of tanks supported (324-322) is approximately equal?" The briefing was well received by Dr. LaBerge, MG Oren DeHaven, ACSLOG-DA, and representatives of other DA staff elements.[81]

Retail Stockage Policy Evaluation (RSPE). The ODCSLOG, DA, directed the RSPE study. The study demonstrated the capability to simulate or model alternative stockage policies. There were several phases in this study: Phase I concerned class IX supply; succeeding phases addressed other classes. Part 1 of Phase I demonstrated the capability of comparative analysis of stockage policies of AR 710-2 against variations of those policies. Days of supply economic order quantity and economic inventory policy were evaluated using AR 710-2 criteria against variations of those criteria. The models successfully demonstrated the capability to evaluate alternative stockage policies (using a common data base) and a final report was promised to the ODCSLOG during FY 79-1.[82]

Army Command and Control Master Plan (AC^2MP). AR 5-5 and 5-21 established the AC^2MMP. The Army hoped to develop an integrated strategic and tactical command and control system capability by 1985. To realize this, the IBM Federal Systems Division was contracted under the auspices of DCSOPS, DA, with TRADOC supporting actions delegated to the Combined Arms Combat Development Activity. The LOGC provided combat service support (logistics) technical development and review assistance to CACDA. When originally received, the TRADOC tasking was assigned within the LOGC to the Operations Analysis Directorate. The LOGC participated in the development and review of the theater nuclear phase documentation. On 9 June 1978, the CACDA project officer briefed the LOGC Commanding General, staff, and directors on the AC^2MP concept. The LOGC participated in architectual guidance development for the nonnuclear and reconstitution phases. On 1 August 1978, the DA assigned an officer to

the LOGC as the AC^{2}MP project officer, and the project shifted from the OAD to the C&D Directorate. The LOGC continued participation in the technical development of CSS (logistics) applications to the AC^{2}MP effort during the initial development of the conventional phase. The AC^{2}MP project was scheduled for contractual completion during FY 79-4.[83]

Weapon System Replacement Operations. TRADOC jointly tasked the LOGC and the ADMINCEN to formalize an effort to determine the best method of replacing inoperable critical weapon systems so that the maximum number of the systems remain in the battle at all times. The tank became the primary example for the study. TRADOC approved an outline plan on 19 May 1978. The LOGC sent the concept paper and a detailed briefing to the LOGC associated schools, the Infantry School, the Field Artillery School, the Aviation School, the Armor School and Center, the Combined Arms Center, FORSCOM, and USAREUR. All addressees responded favorably with the exception of USAREUR. This concept designated weapon system managers from battalion to corps and established a weapon system status report, which reflected current shortages (personnel and equipment) and systems undergoing repair. The division support area was designated as the primary link-up point for the weapon and crew with the corps support area providing backup. The final report was dispatched to TRADOC on 29 September 1978. If approved by TRADOC, the concept most likely will be tested in USAREUR. Should the concept be approved by DA, it could serve as a model for other critical weapon systems; for example, infantry carrier or fighting vehicle, 155 MM SP Howitzer, TOW and attack helicopter.[84]

Battlefield Automation Management. On 5 May 1977, MG Vinson, TRADOC, directed the establishment of a study group at CACDA to develop a philosophy for battlefield automation and a methodology for controlling the proliferation of automated battlefield systems. Formation of this study group resulted from a review of tactical automation at the Tactical Automation Appraisal II held at Fort Hood, Texas, 12 and 13 April 1977. At that meeting, the VCSA directed TRADOC to develop a general philosophy and approach to the whole question of automation on the battlefield. The study group convened at CACDA on 16 May 1977, with representatives from the CAC, LOGC, ADMINCEN, Signal Center (SIGCEN), US Army Intelligence Center and School (USAICS), TRADOC Systems Analysis Activity (TRASANA), and the project manager for Army Technical Data Systems (PM ARTADS). The LOGC sent representatives to both meetings. On 1 August 1977, the study group battlefield automation management plan was briefed to General Starry, CG, TRADOC, and on 4 August 1977, it was briefed to and approved by the VCSA. Efforts to implement the plan began in September 1977, with the development of the battlefield functional system concepts for

the eleven battlefield systems identified in the plan. The LOGC was tasked to develop the functional concept for the logistics system by 30 September 1977. The Center accomplished its mission and submitted it to CAC. Further efforts in implementing the plan continued into FY 78.[85]

Army Tactical Automatic Data Processing Equipment (ADPE) Maintenance. Tactical ADPE encompassed those systems which provided automated support for the broad areas of command and control, intelligence, combat support, combat service support, operations, fire support and coordination, and air traffic control. It included commercial ADPE used by the Army in-the-field. These ADPE systems were either "imbedded," such as the ballistic computer in a fire control system, or "free standing" such as the tactical operations system (TOS) computer. Because of this diversity, there has often been a lack of coordination in the selection and training of the MOS to maintain the equipment. On 18 August 1978, the LOGC tasked the USA Signal Center to conduct a complete study on ADPE to include training, maintenance, and supply. The Signal Center submitted its plan on 4 October 1978. An initial study advisory group (SAG) was scheduled during FY 79-1 to finalize the study plan.[86] The study expected to last at least 18 months.

Retail Inventory Management Stockage Policy (RIMSTOP). The Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics (ASD MRA&L) published the RIMSTOP guidance for the management of secondary items (spare parts and repair parts) at the Army's installation, GS and DS levels, in February 1978. DODD 4140.44 (general policies), DODI 4140.45 (guidance for consumable items), and DODI 4140.46 (guidance for reparable items) contained these policies.

In compliance with the directives, a DA level "technical coordination group" chaired by the Office of the ASD MRA&L managed the RIMSTOP policy. The group met quarterly at a minimum, technically reviewed the DA implementation plan and made recommendations to the ASD MRA&L, monitored implementation practices, provided a forum for review of ideas and proposed improvements, evaluated (simulate/model) policy alternatives, evaluated DA compatibility with RIMSTOP, established reporting procedures to measure performance against goals and in relationship to assigned reason for stockage codes and submitted a detailed implementation plan to ASD MRA&L, which included the exclusions and deviations required to support mobile operating forces whose inventories are considered to be held in support of, integral to, and physically controlled by a unit whose primary mission requires the "continuing geographic relocation" of that inventory and appropriate RIMSTOP implementation milestones.

On 24 July 1978, the LOGC completed its review of these directives and provided concurrence with the ODCSLOG, DA, preliminary position on RIMSTOP. DA ODCSLOG taskings relative to actions required for implementation of these policies was to be established during FY 79-2. FY 79-3 remained the target date for completion of this study.[87]

Missile and Munitions Evaluation (MAME) - 78. The MAME-78 study convened with teams composed of DARCOM and TRADOC personnel visiting a number of CONUS installations, overseas activities, and units in Europe. Pacific command activities and units were surveyed by mail. Survey findings were scheduled for incorporation in a final report during FY 79-1. The MAME report promised to portray the worldwide status of missile and munitions logistical support in the areas of doctrine, organization, training, publications, and personnel.[88]

Direct Support System (DSS). The LOGC was tasked to assist DCSLOG, DA, and DARCOM in writing Chapter 9, Wartime Operations, to FM 38-725, DSS Management and Procedures. The finished document was scheduled to be printed and distributed during FY 79-1. The most significant features of the procedures resolved the requisition and distribution flows of the DSS materiel and the role of the TA in supporting corps wartime requirements.

DSS materiel flows divided into ALOC and non-ALOC segments: (1) ALOC materiel, composed of lightweight class IX items and selected class II materiel, was requisitioned directly upon CONUS by the COSCOM and the TAACOM MMCs. ALOC materiel flowed directly to the requisitioner, and (2) Non-ALOC materiel (other class II, III (pkg), IV, V (selected components), VII, and heavy tonnage IX) was requisitioned from the TA MMC by the COSCOM and TAACOM MMCs. Non-ALOC materiel flowed from the TA MMC storage sites directly to the requisitioner. The TA MMC requested replenishment of its stock from CONUS. The bulk of ALOC shipments from CONUS and non-ALOC shipments by the TA proceeded directly to GS units under control of the COSCOMs and TAACOMs.[89]

Doctrinal Literature

FM 54-2, Change 1, The Division Support Command and Separate Brigade Support Battalion. The scope of Change 1 to FM 54-2 included the addition and expansion of doctrine on airdrop requests and planning for out-of-sector support, the updating of organizational changes and doctrine affecting some maintenance units, and updating of some logistics terms and other information. Change 1 was published and distributed on 31 August 1978.

FM 54-7, Theater Army Logistics. On 2 November 1976, the camera-ready mechanicals for FM 54-7 were handcarried to HQ TRADOC. A telephone inquiry to TRADOC on 4 December 1976 indicated that the manual was still at TRADOC and required some minor graphic corrections. On 15 December 1976, the mechanicals were returned to the LOGC where they were corrected and returned to TRADOC on 20 December 1976. Publication and Army-wide distribution of the manual were made in March 1977.

FM 54-10, Logistics - An Overview of the Total System. On 6 October 1976, BG Vuley approved the direction, general format, and scope of a preliminary draft text of FM 54-10. The manual, incorporating comments from BG Vuley and the LOGC directorates, was forwarded to the Army Logistics Management Center for review and comment. ALMC represents DARCOM in the review of field manuals. On 23 November 1976, the final draft text and pencil dummy of the manual were reviewed and approved by the Doctrine Management Review Board, subject to the appropriate disposition of salient comments from members of the board. Copies of the final draft text and pencil dummy were sent to HQDA and HQ TRADOC on 30 November 1976, for review and approval. On 19 January 1977, the manual was briefed to MG Graham. It was pointed out that while we had received and resolved TRADOC comments, we had not yet received comments from HQDA. Both BG Vuley and MG Graham emphasized the need to get the manual to the field as soon as possible. After comments were received from HQDA, they were reviewed and evaluated. Applicable comments were incorporated into the manual. On 14 February 1977, the comprehensive dummy and DA Form 260 (Request for Printing of Publication) were forwarded to TRADOC, accompanied by a letter of transmittal from BG Vuley to GEN DePuy citing the need for the manual in the field and requesting assistance in expediting its publication. On 3 March 1977, the camera-ready mechanicals were completed and handcarried to the Fort Lee Field Printing plant where 200 advanced copies of the manual were printed and delivered to the LOGC on 1 April 1977. The advanced copies were provided to the attendees at the LOGCAB and the ALPC meetings at Fort Lee. Official publication and Army-wide distribution of FM 54-10 was made on 30 June 1977.

FM 71-100, Armored and Mechanized Division Operations. The draft of FM 71-100 was forwarded to the LOGC as an inclosure to a personal letter (Incl 4) from GEN Starry to MG Smith which requested LOGC comments on the combat service support portions of the manual. Chapter 6 of the manual had been reviewed by the LOGC previously, and comments were forwarded to TRADOC on 15 December 1977. About one-half of the LOGC comments were accepted. On 28 February 1978, directors and project officers of the C&D and Organization Directorates met with COL Scribner, Chief, Tactical Doctrine Office, TRADOC. As a result of this meeting, a complete review of draft 71-100 was accomplished. Comments were prepared and forwarded to COL Scribner on 20 March 1978 simultaneously with GEN Smith's reply (Incl 5) to GEN Starry's letter.

Other FMs. The LOGC prepared the following FMs for publication during this period: FM 54-9, Corps Support Command; FM 31-82, Base Development; FM 63-1, Combat Service Support Operations - Separate Brigade; FM 63-3, Combat Service Support Operations - Division; and FM 63-3, Combat Service Support Operations - Corps.

Restructured Division Operations Manuals (RDOM). The purpose of the Restructured Division Operations Manual program was to provide organizations of a test restructured armored division with manuals which would serve as doctrinal guidance for tactical employment. The LOGC was tasked by TRADOC to prepare RDOM 54-2 in accordance with the restructured division supply. A review of the draft was completed by TRADOC and 18 other addressees designated by TRADOC. The final printing was completed by Field Printing with a publication date of 13 May 1977. As directed by TRADOC, copies were forwarded to the TRADOC Combined Arms Test Activity and to the 1st Cavalry Division for use in conducting tests of the restructured division. Courtesy copies were sent to TRADOC and to all reviewers of the coordinating draft.

Other RDOMs. The LOGC reviewed the coordinating drafts of 26 RDOMs from a logistics support doctrine viewpoint and provided specific logistics input to RDOM 71-100, Operations, Armored Division. Of the 26 RDOMs, 23 reviews were completed by 14 January 1977; reviews of the other three were completed later in accordance with TRADOC guidance.

AR 710-2, Materiel Management for Using Units, Support Units, and Installations. The C&D Directorate was tasked to review the revised regulation and to provide comments and input to the Logistics Evaluation Agency, the proponent of the regulation. In November 1976, the LOGC recei ed and reviewed each of the draft chapters of the revised regulation. In March and June 1977, LOGC and LEA representatives met to review the changes that resulted from the worldwide staffing of the draft chapters. Issues that were not resolved in the meetings were discussed with DA DCSLOG representatives in May and September 1977. At the end of FY 1977, the final draft of the revised regulation was being staffed worldwide.

Standard Expanded Direct Exchange (DX-X). Responsibility for retail level direct exchange was assigned to the LOGC. Concurrently, the LOGC was tasked to further evaluate both the basic doctrine and automated procedures associated with DX. As a result of the LOGC's evaluation and a subsequent general officers' meeting on 1 November 1976, it was decided to continue with a revised AR 710-2 version rather than the DA Cir 700-24. The revised AR 710-2 procedures were developed and underwent staffing at Fort Bragg and Fort Knox. Revised procedures were planned for inclusion in the present revision of AR 710-2.

TC 18-1, ADP Outage Procedures for Combat Service Support Systems. On 20 January 1977, the Commanding General, LOGC, tasked the C&D Directorate to prepare a doctrinal publication on ADP outage procedures. In March 1977, TC 18-1 was entered on the TRADOC portion of the Army-wide Training Literature Program (ATLP) as an urgent addition. The preliminary draft was staffed for review within the LOGC, the review comments were incorporated into the text, and the draft was reproduced as a handout to LOGCAB attendees. On 22 April 1977, a coordination draft of TC 18-1 was distributed for Army-wide review. Several reviewers of the TC commented on its apparent duplication of the material contained in AR 18-7, Army Information and Data Systems Processing Activity Management, Procedures, and Standards. DCSLOG-DA nonconcurred in the publication of TC 18-1 and recommended that staffing and development cease. The Director of the C&D Directorate submitted a recommendation to the CG, LOGC, that work on TC 18-1 be discontinued, and that the publication be deleted from the TRADOC portion of the ATLP.

Allied Tactical Publication (ATP) 35. During the ninth meeting of the NATO Land Forces Tactical Doctrine Working Party, the US representative agreed to develop a revised chapter on combat service support for ATP 35. TRADOC tasked the LOGC to prepare a revised version on the combat service support chapter and forward it to TRADOC by 10 May 1978. The Literature Office was subsequently given the requirement to prepare the chapter with a suspense date of 10 May 1978. Upon completion, it was sent to the Combined Arms Center, Fort Leavenworth, KS.

TC 100-10, Combat Service Support in Battle. TC 100-10 is being developed jointly between the LOGC and the ADMINCEN as the initial "How-to-Support" publication. It will serve as a basis for the development of follow-on how-to-support manuals. In December 1977, approval of the topical outline and milestone chart for the TC was received from TRADOC. The preliminary draft was completed in January 1978, and comments on the preliminary draft of TC 100-10 were received in early April. These comments were used to develop the coordination draft which was sent out

to the field in May 1978 for review and comment by mid-June. Comments received from DCSLOG, DA, TRADOC, and USAREUR indicated that the phase II study concepts should be incorporated into the training circular. Actions were taken to incorporate these concepts along with all other applicable comments received from the field and a revised coordination draft was completed in September 1978. The draft was then forwarded to the Fort Lee Field Printing Plant for reproduction prior to distribution of the revised draft for review and comment. Revision of the coordination draft to include the phase II study concepts slipped the completion date for the training circular approximately four months.

How-to-Support Manuals. On 5 September 1977, MG Smith received a letter from GEN Starry which indicated a concern that the present combat service support manuals do not come to grips with the "how to" of CSS as well as they could. The letter proposed a How-to-Support literature program dealing with CSS from the forward edge of the battle area (FEBA) back through the system in terms of rearming, refueling, fixing, and replacing as far as possible. The development of the HTS series of publications proposed by GEN Starry commenced with developmental efforts on TC 100-10, Combat Service Support. On 18 and 19 January 1978, a meeting was held at the LOGC to introduce the HTS program to the LOGC associated schools, the ADMINCEN, and TRADOC. It was agreed that the development program should be divided into two phases:

(1) Phase I. This phase includes development of the following LOGC manuals: TC 100-10, FM 63-1, FM 63-2, and FM 63-3. These manuals are covered in other paragraphs of this report. Phase I also includes several division level manuals being developed by the LOGC associated schools. In early April, a topical outline and milestone chart for a HTS manual on division transportation operations was approved by TRADOC. Subsequently, topical outlines and milestone charts were approved for HTS manuals on division service operations, division supply operations, division maintenance operations, and division transportation operations.

(2) Phase II. This phase includes development of FM 100-10, Combat Service Support, which is being held in abeyance until the completion of TC 100-10, and FM 63-4, Combat Service Support Operations - Theater Army, which is being held up pending finalization of doctrine resulting from the Phase II Study, Logistics, Operations in the Communications Zone. This phase also includes any additional manuals identified as requiring revision or development to support the HTS concepts. The only manual identified to date is FM 55-40, Army Combat Service Support Air Transport Operations.

How-to-Support (HTS) Films. In April 1978, the C&D Directorate completed the review and incorporation of comments on the doctrine content paper for the three HTS films on combat service support in the

division. In coordination with the QMS and the ADMINCEN, the content papers were annotated to indicate the desired depth and breadth of coverage for specific doctrinal areas to be depicted in the films. Upon completion, the content papers were turned over to the film producer at Redstone Arsenal to be used as best general material by the film script writer. The initial draft script for the first film, Division-Level Combat Service Support, was not received until late in August 1978. The initial draft script was forwarded to the QMS, the ADMINCEN, and the TRADOC for review and comment. By the end of the period, all comments had not yet been received. Because of delays in developing the scripts, the initial shooting date scheduled for August 1978 slipped to FY 79-3.

WARPAC FMs. The status of WARPAC FMs was as follows: Completed: FM 42-5-4, Scoop Loader, Model MW-24 and MW-24B, 31 October 71; FM 42-9-9, Carrier, personnel, FT: Armored, M113A1, 31 October 1977; FM 42-9-13, Truck Tractor: 10-Ton, 6x6, M123C and M123A1C, 31 October 1977; FM 42-9-17, Howitzer, Heavy, SP: 8-Inch, M110, 31 October 1977; FM 42-9-19, Machinegun, 7.62mm: Light, Flexible, M60, 31 October 1977; FM 42-5-9, Generator Set, Diesel: 60 KW 400 HZ, 12 April 1978; FM 42-5-10, Armored Vehicle - Launched Bridge: M60 series tank chassis, 30 June 1978; FM 42-9-11, Truck, Cargo: 2 1/2-Ton M35A2, 12 April 1978; FM 42-9-12, Combat Engineer Vehicle: M728, 12 April 1978; FM 42-9-21, Recovery Vehicle, Light Armored: FT, M578, 12 April 1978; FM 42-11-3, Radio Teletypewriter, AN/VSC-2, 18 September 1978; FM 42-11-4, Radio Set, AN/ARC-114, 30 June 1978; FM 42-11-5, Communications Center: AN/TSC-76, 18 September 1978; FM 42-11-6, Radio Set, AN/VRC-12, 30 June 1978; FM 42-11-7, Switchboard, Telephone: Manual, SB-86/P, 30 June 1978; FM 42-11-9, Radio Terminal: AN/TRC-145, 30 June 1978; FM 42-11-11, Radio Set: AN/ARC-115 and 116, 30 June 1978; FM 42-11-15, Telegraph-Telephone Terminal: AN/TCC-29, 18 September 1978; FM 42-11-16, Repeater Set Radio: AN/TRC-113, 18 September 1978; FM 42-11-17, Switchboard, Telephone: Manual, SB-22/PT, 12 April 1978.

Submitted to the printer for publication: FM 42-9-8, Tank Combat, FT: 152MM, M60A2; FM 42-11-12, Central Operations Teletypewriter: AN/MGC-19; FM 42-11-13, Radio Teletypewriter: AN/GRC-122; FM 42-11-14, Teletypewriter: TT-76/GGC and TT-98/FG; FM 42-55-4, Helicopter, Cargo Transport: CH-54B; FM 42-55-5, Helicopter, Observation: OH-58A.

Training Packets. The C&D Directorate was tasked by the Logistics Training Board to develop the Division Logistics (DIVLOG) Simulation Module for selected sections of the DISCOM/Division Materiel Management Center. A DISCOM/DMMC packet was developed to be used in conjunction with other division level battle simulation games and is not intended to "stand alone." To achieve maximum benefits, realistic data must be played; such as, TOE, MTOE, SOP, consumption data, and time and distance

factors. Timely and "real world" problem play may be inserted by controllers consistent with tactical and logistical doctrine if the scenario does not create sufficient play to drive the packet. Controller and player packets were developed for training. An initial coordinating meeting was hosted by the LTB on 30 and 31 August 1977. Attendees included representatives from the LTB and C&D Directorates, LOGC; US Army Ordnance, Chemical Center and School; US Army Missile and Munitions Center and School; Directorate of Training Developments, Fort Eustis, Virginia, US Army Quartermaster Center and School; and the Combined Arms Training Developments Activity. Informal presentations were made and each packet was critiqued. On 4 October 1977, attendees met at Fort Leavenworth to finalize the DIVLOG packages. Each packet was reviewed and interfaced with established battalion packets. The 24th Infantry Division tested DIVLOG during FY 1978.

Commander's Materiel Readiness Aids. The C&D Directorate was tasked to prepare the Commanders' Materiel Readiness Aids. This task was initiated by a letter from BG John D. Bruen, ODCSLOG-DA, dated 13 July 1976. The commanders' aids consisted of a series of 3x5 cards containing reference information for materiel readiness. Sample aids (smart cards) were prepared and submitted to ODCSLOG-DA for approval. ODCSLOG revised the cards and sent them to USAREUR and to the Armor School for comment. On 8 December 1976, ODCSLOG-DA notified the LOGC action officer that the cards would be sent to the MACOMs and no further LOGC action was required.

Logistics Terms, Abbreviations, and Acronyms. Coordination review of the logistics terms, abbreviations, and acronyms was completed with the USAMMCS, the USAQMS, and the USAOCC&S. Comments were resolved with the schools and also LOGC directorates. A list of 199 candidate terms, abbreviations, and acronyms were forwarded to TRADOC on 12 June 1978 with the request that the list be approved by TRADOC and forwarded to HQDA, ATTN: DAAG-OPC, WASH DC, for publication in the appropriate regulation.

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2. For a short but useful analysis of division restructuring, see "1980 Division," Army Logistician (Nov-Dec 77), p. 17.

3. Ibid.

4. Concepts and Doctrine Directorate, Semi-Annual Historical Feeder Report, FY 78-1, pp. 19-20. (Hereafter, Concepts and Doctrine Directorate will be written as C&D.)

5. C&D, Semi-Annual Historical Feeder Report, FY 78-2, pp. 17-20. (Hereafter, this will be written as S-AHFR.) See also Ltr, ATCL-CG, GEN Smith to Major General Fred Sheffey, Cdr, US Army Quartermaster School, 8 May 78, subj: Restructured Heavy Division. See also Msg, 142128Z Oct 77, From Cdr, TRADOC to AIG 7444, subj: Air Assault Division Restructuring, for an in-depth analysis of air assault division restructuring.

6. Ltr, DALO-SMM-F, 2 Dec 76, subj: Evaluation and Implementation of Restructured General Support Concepts (formerly Combat Oriented General Support), with 1st Indorsement, HQ TRADOC, ATCD-DA, 20 Dec 76; Ltr, ATCL-GS, subj: Restructured General Support (RGS), 12 Jan 77; Ltr, ATCL-EE, subj: Restructured General Support/Direct Logistics Support (RGS/DLS) Outline Test Plan (OTP) for the Fort Hood Evaluation, 6 Jan 77; LOGC Memo, ATCL-DCG, subj: Management of the RGS Project, 1 Jul 77; TCATA Test Report FM 360A, Restructured General Support (RGS) Evaluation, Jan 78.

7. C&D, Annual Historical Feeder Report (hereafter AHFR), FY 77, pp. 9-10.

8. C&D, S-AHFR, FY 78-2, p. 14; Commander's Report to TRADOC, p. 8. See also Msg, 081600Z Sep 78, DA WASH, DC, to TRADOC and LOGC, subj: Restructured General Support. The DA complemented TRADOC and the LOGC for their "outstanding work to formulate, study, and evaluate an innovative concept to improve the logistical general support (GS) structure of the Army." Concluding, DA acknowledged, "the fine performance of the LOGC RGS Task Force and associated TRADOC schools...." See also Ltr, GEN Graham to Cdr in Chief, USA Europe and 7th Army, 1 Apr 77, subj: Evaluation and Implementation of Restructured General Support Concepts.

9. Operations Analysis Directorate, Annual Historical Feeder Report, FY 77, p. 6.

10. Operations Analysis Directorate, Semi-Annual Historical Feeder Report, FY 78-1, pp. 1-2.

11. LTC David A. Braithwaite, "USAREUR's Logistics Blueprint: MODLOG," Army Logistician, (May-Jun 77), pp. 6-9. See also C&D, AHFR, FY 77, pp. 1-2.

12. Ibid.

13. "ALOC - Key to Improved Readiness," Army Logistician (May-Jun 77), pp. 24-25.

14. Msg, DALO-SMS, HQDA, 132035Z Jan 77, subj: (ALOC) for Korea.

15. Ltr, ATCL-CLT, Ellwood C. Hurford, subj: Combat Development Study Plan: Air-Line-of-Communications (ALOC) for Korea (ACN 36288). See Draft Report: Air-Line-of-Communications for Korea (ACN 36288, Apr 77).

16. Ltr, ATCL-CLT, subj: ALOC for Korea Study Coordination Comments (ACN 36288), 2 Jun 77.

17. C&D, AHFR, FY 77, pp. 30-32.

18. Ibid., p. 4.

19. C&D, S-AHFR, FY 78-2, p. 8. See also Trip Report, ATCL-CTC, 5 Apr 78, subj: Communications Support Requirements (COMSR) Planning Group Meeting, Memo for Director, C&D, from CPT Robert A. McCleskey.

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21. Memo, ATCL-CSZ, Memo for Commanding General, subj: Reserve Component Advisory Group (RCAG) Meeting, 1 Nov 77.

22. Commander's Report to TRADOC, p. 9.

23. Msg, 212105Z Feb 78, DA (DALO-PLF), subj: Logistics Force Structure Development; Msg, 241834Z Feb 78, DA (DALO-PLF), SAB.

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27. C&D, S-AHFR, FY 78-1, pp. 6-7.

28. LOGCAB VIII, 8-9 Nov 77, p. 54.

29. MG Eivind H. Johansen, "Reliability Centered Maintenance," Army Logistician (Jul-Aug 77), pp. 25-27. See also Army Logistician (Mar-Apr 78), p. 38; C&D, AHER, FY 77; C&D, S-AHFR, FY 78-1 and FY 78-2.

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31. Ltr, ATCL-CLS, 30 Aug 77, C/S James H. Carroll, Jr., COL, to HQDA, DALO-SMS, subj: Class IX Study (CLIX); DALO-SMS, Ltr, 27 Jun 77, subj: Combat Developments Study Directive - Class IX Doctrine and Concepts; Ltr, C/S, LOGC to Cdr, TRADOC (ATTN: ATCD-SP-L), 29 Aug 77, SAB; Ltr, C/S to HQDA, DALO-SMS, SAB, 29 Aug 77; MFR, ATCL-CLS, 29 Aug 77, SAB.

32. C&D, AHFR, FY 77, pp. 18-21; C&D, S-AHFR, FY 78-1, p. 12 and FY 78-2, p. 10. See also Ltr, ATCL-CG, 24 Jun 77, subj: Authorized Stockage List (ASL) Mobility Study (ACN 24413); Ltr, ATCL-CLS (8 Apr 77), 2d Indorsement, subj: ASL Mobility Study, 24 Jun 77 (to TRADOC); Ltr, from TRADOC (ATCD-SP-L), to LOGC, 28 Feb 77, SAB; Ltr, DALO-PLO, HQDA, to LOGC, 17 Feb 77, SAB; ASL Mobility Study - Coordination Draft, ACN 24413, Apr 77.

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37. C&D, AHFR, FY 77, pp. 6-7; LOGCAB VII, 26-27 Apr 77, pp. 2-7 and 2-8. See also MAJ Edward G. Talpas and Donald W. Osgood, "Containerization Comes to Ammunition," Army Logistician (May-Jun 78), pp. 12-16; Trip Report, 4 Feb 77, ATCL-CLT, Donald W. Osgood to USATC&FF, Fort Eustis, 2-3 Feb 77, subj: Containerization.

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75. C&D, AHFR, FY 77, p. 14; LOGCAB VII, p. 2-5; LOGCAB VIII, pp. 6-7.

76. C&D, AHFR, FY 77, p. 17.

77. Ibid., p. 26.

78. Ibid., p. 33; LOGCAB VIII, p. 8.

79. C&D, AHFR, FY 77, p. 34.

80. C&D, S-AHFR, FY 78-1, pp. 7-8. See also Victoria Dibbern, "Food for the Soldier," Army Logistician (Mar-Apr 78), pp. 18-21, and Karen Prelle, "Soviets Cook On The Move," Army Logistician (Mar-Apr 78), pp. 22-23.

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87. C&D, S-AHFR, FY 78-2, pp. 4-7.

88. Ibid., FY 78-1, p. 14; FY 78-2, p. 10; See also LOGCAB VI, 19-20 Oct 76, pp. 4-1 to 4-5.

89. C&D, S-AHFR, FY 78-1, p. 18; FY 78-2, pp. 13-14.

90. For doctrinal publications and literature, see C&D, AHFR FY 77; S-AHFR, FY 78-1 and FY 78-2.

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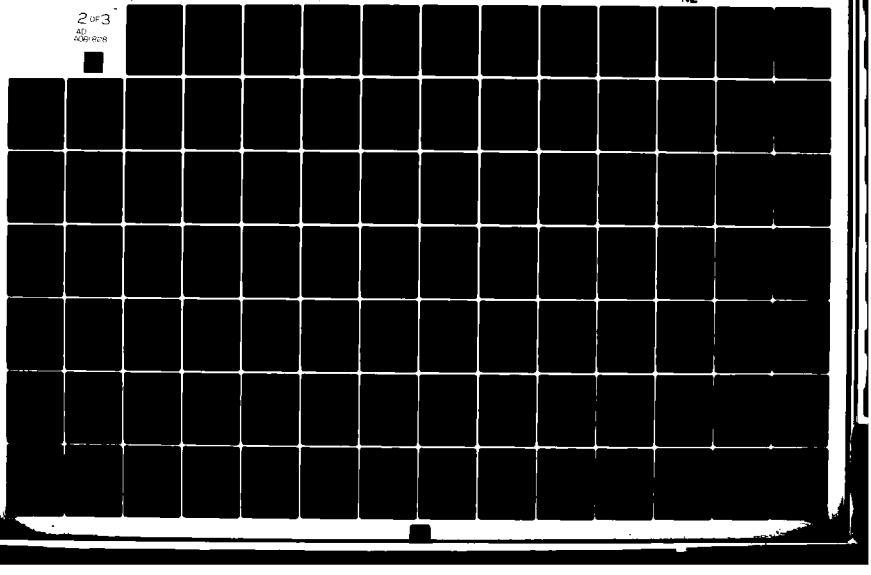

CHAPTER 3

MATERIEL DEVELOPMENT: WEAPONS AND EQUIPMENT

The Soviet Union's massive buildup of strategic air, land, sea, and intercontinental strategic forces during the 1970s prompted a reassessment in the United States and among their allies in Europe of NATO weapons and equipment requirements. This Soviet resurgence threatened the very existence of Western Europe and prompted a debate both in the press and Congress over America's military strength.[1]

DA officials recognized this imbalance and stressed the need for newer and more sophisticated weapons. Charged with the responsibility for defining and setting the operational requirements of improved and new weapons and equipment for the whole Army, TRADOC took a long and sobering look at the situation. During the period FY 77 and FY 78, TRADOC worked to redress the imbalances by fielding a maximum number of completed systems to meet the needs of near-term modernization, stronger management of system development and acquisition, development of competitive prototypes, and stronger, broader efforts that would lead to innovative and major new technological directives. The LOGC played a prominent part in meeting these TRADOC goals.[2]

Within the Army, two programs overshadowed all others: the armor challenge and the antiarmor focus that it compelled. Additionally, standardization and interoperability in weapon development necessitated close scrutiny.

The Defense and Army policies that resulted from this increased interest demonstrated a sound basis. The Army developed a whole range of new systems. "These developments represented the greatest infusion of weapons into the US Army since World War II," the TRADOC Historian observed. At the 1977 Fort Knox Armor Conference, the TRADOC Commander, General DePuy, acknowledged that the new weapons enabled "the US Army to catch up qualitatively in most fields and to forge ahead in some."[3] FY 77 and FY 78 saw steady progress in the effort the LOGC shared with TRADOC, DA, DARCOM, and other agencies to press ahead with full materiel modernization. Some of the major weapon developments during this period included the XM-1 Tank, the STINGER air defense missile, improved TOW vehicle, the AN/TSQ-73 missile minder, the 30 kilometer range XM198 155mm howitzer, the AN/TPQ-36 and 37 mortar locating and artillery locating radars, artillery delivered mines, infantry and cavalry fighting vehicles, the COPPERHEAD cannon launched guided projectile, the HELLFIRE missile, the Advanced Attack Helicopter, the ROLAND and PATRIOT air defense missiles and the BUSHMASTER automatic cannon.[4]

In addition to these major weapons and weapons systems, the Army continued its programs for Army materiel actions including all kinds of handcarried portable, and towed weapons; combat vehicles; ammunition; and explosives. Special systems, such as tactical nuclear weapons and and explosive ordnance disposal equipment, were also included.

Materiel developments encompassed a wide range of diverse and explosive weapon and equipment developments during this two-year period. The LOGC played a vital part in this maturation as reflected in the many Center studies, programs, and analyses conducted during this short timeframe and described in the following pages.

Infantry Weapons

The antiarmor debate set in motion by the 1973 Mideast War dominated developments in infantry weapons. Analysts noted the intensive study that the war stimulated in Soviet military journals and the apparent worry posed to the Soviets by NATO's potential antitank capabilities. Some NATO allies, as well as US forces in Europe were armed with the long-range, 3,000-meter TOW missile, and the medium-range, 1,000-meter DRAGON had been deployed in Europe-based US forces the previous year. While concern continued to center on the best vehicular adaptations of antitank missiles and their best tactical use, as well as on the still inadequate numbers deployed, some further improvements were made to these highly accurate, optically-tracked, wire-guided weapons.[5]

Small Missile Support. Small missile support gained increased importance and high-level visibility during this period because of the increased emphasis throughout the Army on countering the enemy armor threat. In late April 1976, the LOGC participated in the antiarmor systems program review conducted at Fort Leavenworth for the Vice Chief of the Army. One of the major areas addressed by the LOGC at this review was logistics support for small missiles. Concomitantly, the increase in the number of small missiles within the division combat elements, i.e., the DRAGON system and the TOW system caused the LOGC to focus its attention on the logistics system's capability to properly support these small missiles. The Land Combat Support System (LCSS) provided this support capability.

Land Combat Support System. The LCSS consisted of test, measurement, and diagnostic equipment used at both direct and general support levels. The system allocated one to each division and to the corps based on missile densities. One LCSS supported approximately 500 small missile systems. The LCSS has been plagued with problems--some related to the hardware; some caused by the limited numbers of the LCSS; and others related to the lack of skilled personnel to operate the system and to make repairs on equipment determined to be unserviceable.

In an interim support plan jointly developed by TRADOC and DARCOM and currently at DA, TRADOC and DARCOM recommended funding of the test adapter and single van product improvements, several minor engineering changes, and an essential repair parts stockage list. This plan was designed to improve operational availability through correction of the most pressing problems and to extend its useful life through the mid-1980s or until replacement equipment can be developed for the direct support mission.

As a follow-on action, TRADOC and DARCOM developed a long-range plan which addressed multisystem support equipment as a replacement for the LCSS. In conjunction with the Missile Command (MICOM), LOGC drew up the necessary plans.

The limited number of LCSS continued to be a problem, for DA indicated that no additional LCSS can be procured. Korea requested a second LCSS and LOGC supported them based on their remote location, not their workload. The DA staff issued one of the two floats at Anniston Depot to Korea. In February 1976, USAREUR proposed a reorganization which resulted in increasing their LCSS density from 14 to 16. They allocated two to each division, two to each corps for nondivisional units, and four to the GS role at Wiesbaden. To provide these two additional LCSS, the one remaining CONUS float was used; the other came from a FORSCOM unit.

Finally, an area which affected everyone was the critical shortage of skilled operators and repairmen. While the issue may never be resolved, LOGC felt confident it had at least exposed the problem and noted considerable improvement over the last two fiscal years. The training program reflected adequate input to the Missile and Munitions Center & School courses.

These materiel support actions focused on hardware improvements, worldwide distribution, and personnel status, as well as training enhancements, and contributed to the eventual improvement of small missile support--a key element in today's battle equation.

The LCSS continued as the primary direct and general support test measurement and diagnostic equipment (TMDE) for the TOW, DRAGON, and SHILLELAGH missile systems. Field data analysis, DRAGON OT III A test reports and the Missile and Munitions Field Evaluation 74-75 indicated a wide range of needed modifications to the LCSS to increase its availability. Fourteen modifications were proposed, approved, and funded for development and application. The commodity command expected to complete all but the test adapter in calendar years 1978-79. The test adapter is scheduled for completion in CY 1981. These modifications raised the availability of the LCSS and extended its usefulness as TMDE for the supported systems through the mid-80 timeframe or until replacement support equipment was developed and fielded.

During FY 77, LCSS, with supplementary equipment, were distributed to the 5th, 7th, and 24th Divisions and to Fort Benning, Georgia. A second set was distributed to Korea, Eighth Army, in FY 78.[7]

Automatic Test Support Systems (ATSS). To increase its capability to support critical weapons, the Army employed the latest technological advances provided by automatic testing equipment. LOGC developed a family of automatic test support systems to meet these requirements. TRADOC tasked the LOGC to prepare a required operational capability document for the General Support Automatic Test Equipment (GS/ATE) of the ATSS family. The Center completed and forwarded the document to HQ TRADOC in February 1978.

The ROC called for a mobile general purpose tester of modular design and computer controlled for the testing of printed circuit boards, modules, and line replaceable units. It operated in the corps area within the Restructured General Support (C-E, aviation, and missile) battalions.

Two systems were required to fulfill the requirements for C-E and missiles. These systems included the AN/USM-410, which supports C-E type systems, and the Automatic Test Equipment Missile (ATEM), which supports selected missile systems. These two systems minimized proliferation and cost.

The total ATSS concept visualized the use of built-in test equipment at the organizational level to quickly identify faulty replacement units such as modules, printed circuit boards, assemblies, and subassemblies. Simplified small portable suitcase type testers supplemented this equipment. Maintenance support teams from direct support and general support used these portable testers for rapid and accurate diagnosis.

With the GS/ATE ROC at HQ TRADOC, the Signal School drafted a program to develop ROCs for these portable suitcase testers to be used at the DS and organizational levels of maintenance.[8]

During the LOGC in-house study conducted October-November 1977 to establish a long-range small missile support plan, TRADOC agreed that there should be only one ATSS by the mid-1980s to meet different commodity support requirements. LOGC coordinated milestones with the COEA and PROC scheduled for submission to TRADOC in August and September.

From January-March 1977, a special DARCOM ATSS steering group of 24 general officers assisted in the decision as to what should constitute the ATSS as envisioned by TRADOC. Chaired by the PM ATSS, a special task force constituted the working element of the steering group, and in August 1978, produced a Task Force Report. However, problems arose,

prompting General Smith to report that "the entire ATSS program is a problem of some magnitude and a constantly moving train. We are working within TRADOC and with DARCOM, in an attempt to get the program formalized with well-understood division of tasks and responsibilities. In summary, ATE in the field is required to support the maintenance effort of all materiel commodity areas; i.e., C-E, missile, aviation, and will be used at all levels of maintenance. We must come to grips with how to get standardized ATE into the fields."[9]

A DARCOM meeting decided that an interim ATE solution of AN/USM-410 for C-E support and ATEMS for missile support was necessary while developing the single ATSS for the 1983 timeframe. A ROC package was forwarded to TRADOC for formal staffing in March 1978; to DA for approval in July 1978. In January 1978, the USA Signal School hosted the first organizational meeting for development of a DS/ORG ATE. A Preliminary Operational Concept (POC) was developed for staffing and the PM ATSS tasked to provide an Outline Development Plan (ODP) by April 1978. The second meeting for DS/ORG ATE was conducted 11-12 April 1978. The POC was formally submitted and the ODP was reviewed prior to formal staffing.[10]

Advanced Antiarmor Weapons

Advanced Heavy Antiarmor Missile System (AHAMS). HQDA approved the mission-element-needs statement (MENS) in January 1978 for a follow-on AHAMS to replace TOE. The US Army Missile Materiel Readiness Command (MIRCOM) contracted with five companies for a conceptual study on approaches which might meet the MENS. Contractors provided study results to MIRCOM in mid-1978. The VIPER/AHAMS PM assumed responsibility on 1 June 1978 for the follow-on Medium Antiarmor Missile System (MAMS) to replace the DRAGON system.[11] The MAMS-need statement has not yet been approved by HQDA.

Advanced Heavy Antiarmor Weapon System (AHAWS) Special Task Force (STF). The Chief of Staff of the Army directed the organization of a special task force to develop the best technical approach for an antiarmor weapon system. The STF operated from Ft Benning, Georgia; LOGC provided part-time representation. The STF met at Ft Benning, Georgia, 26-28 June 1978, for the purpose of oral briefings by contractors. MIRCOM let five contracts for conceptual study on 30 January 1978. Reports were submitted on 30 May 1978. The briefings presented at Ft Benning consisted of each company's study effort, selection of technology, configuration, schedule, and cost. The STF evaluated proposals, conducted trade-offs, examined foreign systems, and performed other actions in their effort to develop a conceptual system and necessary documentation to support a development go ahead at the 3d Quarter, FY 79 ASARC/DSARC.[12]

Weapons for Infantry Fighting Vehicles. The 25mm Main Armament System (formerly the BUSHMASTER) began development test (DT) II and operational test (OT) 1A during the period. This phase of testing represented a "shoot-off" between two competing systems; a gas-operated, self-powered gun built by Ford Aerospace Communications Corporation (XM241) and an electrically operated, externally-powered gun built by Hughes Helicopter (XM242 Chain Gun). USALOGC assisted the TRADOC Systems Manager (TSM) at the weapon scoring conference.[13]

Armored Vehicles

XM-1 Tank. The most important Army weapon in development in FY 77 was the XM-1 tank, expected to succeed the M60 series for the 1980s and beyond. The XM-1 represented a genuine breakthrough in tank design and effectiveness. Special Chobham armor, a 1,500-horsepower gas turbine engine, compartmentalized fuel and ammunition cells, a low and narrow profile, and newly developed tank gun ammunition combined to produce a significantly more agile and fire-effective tank with a new level of ballistic protection. As part of this effort, the LOGC assumed responsibility for physical teardowns and for Tank Main Armament Evaluation (TMAE) of the XM-1 tank.[14]

In the past, developers conducted physical teardowns as a matter of routine. In recent years, the contractor directed most teardowns. The Logistics Center achieved a formal physical teardown and maintenance evaluation or PT/ME of the XM-1 tank during the period, 8 February 1977-7 April 1978. USALOGC personnel participated in the TRADOC phase of the PT/ME during the week of 3-7 April 1978. USALOGC also assisted the TRADOC Systems Manager in the preparation of the TRADOC independent evaluation of the PT/ME, the first PT/ME in many years to be conducted with such extensive user participation. Subsequent PT/ME must be held to fully evaluate general support level maintenance and the use of the retrofitted test sets.

As a result of USALOGC and USAOCCS concerns about maintenance problems uncovered during the PT/ME, a meeting was held between the Deputy PM, the TSM, and the LOGC Technical Advisor to discuss the following areas: wiring harnesses, hydraulic lines, turret removal and replacement, air cleaner plenum location, peculiar test equipment, and general support maintenance.

Because the turbine engine in the XM-1 tank used significantly more fuel than the current M60 series tanks, USALOGC tasked USAQMCENFL to perform an analysis of the impact of this increase on the POL transport, storage, and handling equipment and personnel in the Army in the field. USAQMCENFL developed a listing of TOE and the increases in POL equipment and personnel required in those TOEs. These computed increases became the basis for proposed TOE changes prior to fielding the tank.

USAARMC tasked the LOGC to provide logistics input to the XM-1 COEA update. After obtaining data from the proponent school and the project manager, the Center computed the logistics inputs using the Materiel Directorate COEA models and provided the results to the study agency and TRASANA.[15]

In April 1977, the Assistant Project Manager for XM-1 tank at Picatinny Arsenal and TRADOC directed the LOGC provide field logistics information related to a Tank Main Armament Evaluation study. International requirements required this evaluation be made for the Candidate Armament System that had potential to be used on the developing XM-1 tank. The candidates were: (1) the Federal Republic of Germany, 120mm, (2) the United Kingdom, 120mm, and (3) the United States, 105mm. USAOCCS and USAMMCS developed the logistical comparative analysis of using the 120mm gun and its companion ammunition vice the current 105mm gun and ammunition including new emerging ammunition. The criteria used to make the field logistics evaluation were maintenance, supply, transportation, tools, ammunition (tonnage and cubic feet), and facilities.[16]

The LOGC submitted its input for the XM-1 tank Main Armament Evaluation on 21 October 1977 to the Assistant Project Manager, XM-1, USAARRCOM and USAARMC. This input compared the field logistics effects of using either the Federal Republic of Germany 120mm armament or the United Kingdom 120mm armament vice the USA 105mm armament as the XM-1 tank main armament. USAMMCS provided ammunition data and USAOCCS provided an ordnance comparative analysis that was used in the LOGC input. The input indicated that some effects would occur if either the FRG 120mm or the UK 120mm was used. Secretary of the Army, Clifford L. Alexander, recommended to Congress on 31 January 1978 that the Federal Republic of Germany's 120mm smoothbore gun system design begin US development and testing to adapt it to production as the future main armament for the XM-1 tank. LOGC participated in the study to determine the logistics effects of the RFG 120mm, UK 120mm, and the US 105mm tank armament systems. This study determined the cost, schedule, logistics, and transportation consideration that each 120mm armament system would require vice the US 105mm. Although the British system was not selected, the Army plans to work out a mutually agreeable arrangement to continue work on British ammunition technology. Because of the need to field the XM-1 tank as soon as possible, the Army planned to produce XM-1 tanks with the US 105mm gun initially, while beginning cooperative development with Germany. If development efforts succeeded, 120mm gun production could begin in 1984.[17]

Tank Support Mechanisms

Track Width, Tank Mounted Mine Cleaning Roller System. In August 1976, Commander, TRADOC, directed that the US Army Engineer School

(USAES), in coordination with the Armor Center, prepare a draft Required Operational Capability for subject system. In September 1976, Commander, TRADOC, directed that the development to satisfy the ROC be geared to a 1-year Research Development program. On 1 December 1976, TRADOC revised and finalized the roller ROC. In April 1977, LOGC staffed sections V and VI of the Development Plan and forwarded comments to USAES. LOGC/USAES jointly attended a coordination conference at APG to discuss a draft contractor engineer design test plan. LOGC coordinated comments on the Logistics Concept Element of the Test Support Package were forwarded to USAES and incorporated in the USAES input to TRADOC in June 1977. The Combat Developments Study Plan for a Limited COEA was staffed within LOGC and comments coordinated with USAES in July 1977.[18]

Tank Gun Tube, 105mm, M-68. The current gun tube (M-68) for the M60 tank and a candidate gun tube for the XM-1 tank experienced wear problems. Tube wear resulted in a premature condemnation of the tube and causes the projectiles to disperse in wide angles. LOGC, in cooperation with USAARMC, USA Armament Readiness Command (USAARRCOM), USAARDCOM, BRL, and PM-XM-1 evaluated the current problem and recommended a secondary gauge that would monitor the M-68 tube wear, and reevaluate the capability of the projectiles that are most effected by the M-68 tube wear, including delaying production of the M735 FS APDS-105mm.[19]

Tank Thermal Sight. The Tank Thermal Sight (TTS) program started in July 1974, but due to an urgent requirement for a passive night fighting capacity, DARCOM proposed that the TTS program be accelerated. USALOGC conducted an analysis of the proposed accelerated program to insure that integrated logistics support aspects were adequately considered. In coordination with M60 Project Manager's Office, Night Vision Lab, and Texas Instruments, a program developed encompassing a detailed plan for assuring ILS considerations. LOGC forwarded its concurrence to HQ TRADOC on 16 November 1976. On 23 November 1976, HQ TRADOC sent an unconditional concurrence to M60 Project Manager for accelerating the TTS program. The Tank Thermal Sight program entered into Developmental Testing/Operational Testing II in FY 78. Player participants for the test trained at Fort Knox, Kentucky, and Aberdeen Proving Ground, Maryland. The TTS was type classified and went into production. This system required no future logistics actions.[20]

Fire Support

Projectile, 8-Inch High Explosive Rocket Assisted Projectile, XM650E5. LOGC participated and acted as the operational evaluator at an XM650E5 (DT-II) reliability scoring conference, Rock Island, Illinois, 4-5 January 1978. The fuze, rocket, and explosives attained the required reliability requirements except the super quick fusing mode. The PM

held an IPR on 19 April 1978 to examine the M110E2 muzzle brake overpressures on the human ear, the USA Armament Command's XM650E5 "Coppering" problem. TRADOC recommended that XM650E5 should not be typed classified.[21]

Fire Support (FIST) Vehicle System (MECH INF/DR140R/CAV). The LOGC participated in a ROC review for the FIST Vehicle System, 9-10 February 1978 at Ft Sill. The review revealed deficiencies in reliability and interfaces that the system will have with the M113 (i.e., GLLD), external mounts, vehicle positioning equipment, and the north orienting device. Ft Sill corrected these problems in a revised ROC and submitted it to HQ TRADOC in April 1978.[22]

Cannon Launched Guided Projectile, 155mm, XM712. LOGC participated (24 January and 28 March) as a member of the XM712 Cost and Operational Effectiveness Analysis--Study Advisory Group (COEA). The SAG recommended that laser designators, which guide the XM712, be included in the COEA. This delayed the approval of the XM712 Study Plan, but resulted in a comprehensive XM712 COEA.[23]

Infantry and Cavalry Fighting Vehicles

Fighting Vehicle Systems (FVS). The Fighting Vehicles Systems (FVS) included the XM-2 Infantry Fighting Vehicle (IFV) (formerly known as the Mechanized Infantry Combat Vehicle (MICV)) and the XM-3 Cavalry Fighting Vehicle (CFV) (formerly known as the MICV-SCOUT).

The COEA began in December 1974 with the formation of the MICV Special Study Group at Ft Benning, Georgia, and finished during FY 77. In late FY 76, Materiel Directorate developed input to the MICV COEA to determine if the developed product met TRADOC's demands. Completed by the end of July 1976, the input received favorable responses from all agencies. On 14 October 1976, the COEA was restructured with different alternatives and a different Basis of Issue (BOI); as a result, the Logistics Center revised input to the Infantry School on 5 November 1976. Similar input was provided the Armor Center on 6 December 1976. A coordination meeting was held at Fort Knox on 10-11 February 1977 to complete the integration of the two COEA. Final Study Advisory Group meetings occurred in April and June 1977 and the TRADOC Commander was briefed in July 1977. The Logistics Center provided expertise and support to the study agencies at each of the SAGs. Development of the study methodology and inputs for logistics costs were milestone events during the year.

The Commander, TRADOC received and approved the IFV/CFV on 3 January 1978. This report completed 30 months of intensive effort on the part of the various TRADOC centers and schools. LOGC provided one man-year of effort in support of this COEA.[24]

Reliability, Availability, Maintainability (RAM) Issues. The RAM issue on the XM-2/XM-3 became apparent and received visibility when Lt Gen George Sammet Jr., then DCG for Materiel Development, DARCOM, sent a letter to General DePuy, then CG of TRADOC. The letter stated that: (a) the Development Concept Paper and Materiel Need were inconsistent as far as RAM was concerned; i.e., the DCP had a system requirement while the MN imposed additional subsystem requirements; (b) the IFV/CFV automotive reliability requirement was too high and unattainable; (c) both the system and weapon subsystem reliability requirements were unrealistic when applied to the IFV/CFV utilizing the interim M139 gun system. Further, DARCOM recommended that TRADOC delete all subsystem reliability requirements and maintain only a system level requirement and, in addition, that TRADOC and DARCOM establish an interim goal for system reliability for the IFV with the interim gun system.

This Center nonconcurred with the DARCOM proposals stating that (a) the DCP was not inconsistent with the MN since it was derived from the MN; (b) the automotive subsystem requirement was realistic and had experienced several disciplined reviews; (c) the automotive subsystem should have a high reliability since mobility was a top priority characteristic of the IFV; and (d) the M139 gun system should not be required to demonstrate the BUSHMASTER reliability requirement in test.

The TRADOC response to DARCOM incorporated the Center's comments. Further, the TRADOC response reaffirmed the need to call a joint working group to review RAM-D requirements after DT/OT II.

Several messages between General Sammet and Brig Gen William B. Burdeshaw resulted and both DARCOM and TRADOC agreed to maintain a flexible approach with regard to RAM till after completion of IFV/CFV testing. In September 1976, DA decided to buy IFV with M139 gun as an interim vehicle and developed a follow-on IFV/CFV with both TOW and BUSHMASTER. Subsequently, DA directed that an annex be written to the MN to include TOW and BUSHMASTER systems. Later, the decision was made to delete MICV with the interim gun.

In October 1976, the LOGC, Infantry School, and project manager, in a joint working group, wrote a draft annex. Subsequent to the joint working group, the LOGC RAM Office disagreed with the RAM content of the annex. The annex was rewritten and briefed to DA by TRADOC with a split DARCOM-TRADOC position. DA directed that the RAM portion of the annex be revised to reflect the same procedures as used in the XM-1 program.

In December 1976, a joint working group, consisting of representatives from LOGC, Infantry School, TRADOC HQ, and Armor Center, rewrote the annex to reflect similar procedures as used in the XM-1 even though there appeared to be no justification for doing it on the IFV/CFV. The

project manager did not agree with the new annex arguing that since the XM-1 had a system RAM requirement and only subsystem RAM goals, why shouldn't the IFV/CFV? The manager also argued that specifying RAM requirements at the subsystem level decreased his probability of passing a test since he had more requirements to meet. In addition, not enough test time was available to prove out subsystem requirements and the RAM values in the annex were unrealistic and unattainable.

Subsequent meetings between the Infantry School (TSM) and the Project Manager (PM) caused the PM RAM values to be placed in the annex. These RAM values were unilateral agreements between TSM and PM. USALOGC and HQ TRADOC were not involved. USALOGC disapproved of these RAM values in a letter to TRADOC. It was about this timeframe that the LOGC Materiel Directorate started seriously looking at the IFV in an operational environment using a strawman computer model.

Since agreement could not be reached in the TRADOC community on the annex, it was briefed to TRADOC with the hopes of getting TRADOC approval. During the briefing, July 1977, DCD disagreed with the RAM portion of the annex and stated that the RAM values in the annex were too low. DCD further recommended that subsystem requirements be maintained.

As a result of a TRADOC request, this Center restated its position on IFV/CFV RAM in a message to TRADOC during July 1977. The message stressed the need for subsystem requirements and provided some initial results of the Combat Vehicle Reliability Simulation (COVERS) model. In addition, the Center recommended system and subsystem requirements for the IFV/CFV.

The LOGC forwarded officially a complete package of the initial analysis work on IFV/CFV using COVERS to TRADOC. Subsequently, TRADOC required a sensitivity analysis of the IFV/CFV RAM in the short intense 5-day scenario. A LOGC message of 7 October 1977 provided the initial results of this sensitivity analysis and restated LOGC's position. A decision on reliability was reached in January 1978.[25]

Armored Combat Logistics Support Vehicle Family. The future battlefield picture has critical implications for the logistics community. Logistics studies identified new hardware needed to support emerging logistics concepts such as support forward. A LOGC study identified a requirement for a hardened vehicle to resupply ammunition by transporting it directly from the brigade trains area to the combat vehicle in the battle maneuver area.[26]

In fast-moving mounted warfare, high-mobility, armored logistical vehicles must reach the fighting maneuver battalions. To provide this capability, the LOGC continued its involvement in the development of an armored cavalry logistics support vehicle.

The Combat System Rearm/Refuel in Battalions or COSSRIB Study conducted in this Center identified the need for an armored forward area rearm vehicle. On the modern battlefield, basic loads of ammunition in tanks and APCs will be depleted rapidly and thus will need to be replenished frequently, possibly during the battle itself. The AFARV was planned to transport predetermined mixed loads of ammunition from a battalion trains location to the forward battle area and rearm individual combat vehicles.

Present plans call for a basis of issue to maneuver battalions, cavalry squadrons and air defense units. The AFARV has a 7,500-lb or greater payload capability and suitable MHE to assist in the rearm mission. The AFARV was not intended to replace any existing TOE basic load-carrying vehicle, but to complement them.

In consonance with the maintenance support concept of fix-it-forward, the maintenance assistance vehicle was designed to meet organizational and limited direct support maintenance requirements of maneuver, air defense, cavalry squadrons and self-propelled artillery battalions. When required, maintenance assistance teams, utilizing the MAV, deploy rapidly to the combat locations of nonoperational or battle-damaged weapons systems. The MAV carry the maintenance assistance team, essential tools, repair parts, and TMDE and communicate with higher headquarters and supported units. The MAV was developed to replace the wheeled maintenance contact vehicles currently used by forward organizational and DS sections and to supplement recovery vehicles.

Medical evacuation vehicles operate as far forward as the tactical situation permits. The concept provided ground evacuation from platoon or company/battery/troop locations to the battalion/squadron aid station. The MEV offered, in addition to more space, a capability for the medical attendants to apply life-saving techniques while patients are in a ground transport mode. It was decided to issue the MEV on a one-for-one basis to those units now authorized the M113A1 for medical evacuation.

TRADOC approved and submitted to DARCOM a proposed LOA identifying the extended version of the M113A1 and M548 chassis. This chassis incorporated the planned product improvement of the M113A1 family, consisting of improved cooling, suspension and power train systems.

The Armor and Engineer Board completed a Concept Evaluated Program for the AFARV version on 10 May 78. The evaluation report followed in July 1978. The AFARV performed satisfactorily as a forward rearm vehicle for armored and mechanized infantry rearm operations. The Artillery Board initiated a CEP for the M548-Extended at Fort Sill on 10 Apr 78. The CEP ran for 30 days and was evaluated in rearming operations of the M107, M109, and M110 self-propelled howitzers.

The LOGC retained overall coordination responsibility for the program, while proponency for the AFARV, MAV, and MEV was assigned to the Armor School, Ordnance School, and the Academy of Health Sciences, respectively.

As efforts continued to search for ways to improve Army capability to support the battle, the essentialiality of maintaining and supplying the weapons systems on the battlefield remained ever present. The AFARV represented one means of accomplishing this goal.[27]

Improved TOW Vehicle. The ITV program entered OT III Test Phase at Fort Lewis, Washington, and DT III Test Phase at Yuma Proving Ground and White Sands Missile Range. Issues pertaining to the program concerned the turret mechanic and technical publications. LOGC supported the 45N as the organizational turret mechanic until implementation of the Master Mechanic Concept which would then develop a separate MOS for the ITV. Due to deficiencies relative to procedures, illustrations and diagrams of the Technical Manual, LOGC, after coordination with TSM Office, PMO and OT III logistics evaluators recommended that a 100 percent teardown and validation be conducted to assure completeness and correctness of the manuals.[28]

During conduct of Operational Test (OT) III at Fort Lewis, Washington, many hardware publication problems surfaced. As a result, the development acceptance In-Process Review on 21 June 1978 type classified the ITV standard with a provision to have a slow build up of systems and to conduct a follow-on evaluation (FOE). The FOE was designed to validate reliability and publication improvements.

As a result of OT III, LOGC reevaluated the annual maintenance manhour requirement and recommended changes to the quantitative and qualitative personnel requirements information document. In August 1978, LOGC chaired a Joint Working Group meeting at ITV PMO for the purpose of developing basic issue items, and additional authorization lists for the ITV. In September 1978, LOGC in coordination with OCC&S, started developing a publication verification plan for a two-week verification scheduled at OCC&S in February 1979.[29]

M857 Series Bulk Haul and Fuel Servicing Vehicle. The Type Classification for subject vehicle, originally scheduled for December 1977, was completed in May 1977. The M857 series was redesignated as M867, M868, M869, and M870 and was type classified "STANDARD A." As a result of equipment faults found during the maintenance teardown and evaluation of the production vehicle during May 1978, Integrated Logistics Support Management Actions changed the design which improved accessibility, maintainability, and standardization of parts between the four vehicle models (see above).

Production of 220 M970 vehicles slipped to August 1978. As of 30 September 1978, a total of 62 (ea) M970 vehicles were made ready for overseas shipment for the USMC. The balance of vehicles was rescheduled for early CY 79 delivery.[30]

Concept Evaluation Program, Fifth Wheel Wrecker. The Concept Evaluation Program for a Fifth Wheel Wrecker resulted from field users encountering major problems in towing of inoperable, large, commercial vehicles. As more of the large commercial trucks entered the inventory, it became apparent that the Army needed a comprehensive study of battlefield recovery systems. Accordingly, the US Army Ordnance and Chemical Center and School conducted the study and forwarded recommendations to the LOGC. In the interim period, the commercial fifth wheel wrecker offered a plausible solution to the heavy wheeled vehicle recovery problem.[31]

Commercial Substitute for 1/4-Ton Tactical Vehicle. The USAARENBD evaluated candidate commercial substitute vehicles as replacements for twenty percent of the current 1/4-ton vehicle fleet in selected combat support and combat service support units. The US Army Transportation School used this data to perform a mini-COEA. The USATSCH concluded that either a light or heavy commercial recreational candidate would perform adequately to satisfy operational capability requirements of the vehicle. The USATSCH prepared a ROC for this vehicle. HQ TRADOC staffed both the ROC and COEA and sent it out for worldwide staffing on 20 September 1978. Late November 1978 was the selected target date for forwarding the finalized documents to HQDA.[32]

The Family of Expanded Mobility Tactical Wheeled Vehicles. The Family of Expanded Mobility Tactical Wheeled Vehicles program started early in 1977. At that time, the Transportation School, US Army Tank-Automotive Research and Development Command (TARADCOM) and other interested Combat Development activities initiated work on a Letter of Agreement. The LOA's tactical vehicle family consisted of three vehicles with one vehicle in each of the following payload ranges: (1) 3/4 - 5/4 ton; (2) 4 - 6 ton; and (3) 8 - 10 ton. The Family of Expanded Mobility Tactical Truck programs primary purpose consisted in supporting a "New Generation" of combat vehicles; exploiting technological advances; acting on the recommendations of the "Wheels Study; and replacing vehicles which didn't meet the combat, combat support, and combat service support requirements. These requirements help vehicles perform at high speeds over primary and secondary roads, as well as over rough cross-country terrain.

Based on receipt of the Draft Proposed Letter of Agreement, TARADCOM acquired four 10-ton trucks for Technical Feasibility Testing (Military Potential). PACCAR designed and fabricated two trucks and LOCKHEED

manufactured two. Concurrently, the Department of Defense established an International Materiel Evaluation (IME) program to evaluate as acquisition alternatives, those items of foreign free-world materiel which appear to meet US Army requirements. US Army Test and Evaluation Command (TECOM) managed this program and under the IME program, acquired two German 10-ton M.A.N. trucks for evaluation. Testing/evaluation of the 10-ton trucks merged into one program, a comparative technical feasibility test, which began in the Spring, 1978. The test concluded in late 1978.

Based on initiation of the IME test of the 10-ton German M.A.N., high-level DA, as well as DOD, interest developed for the German truck to fill the needs of USAREUR. DA created a sense of urgency and as a result, TRADOC/LOGC decided on 20 June 1978 to separate the LOA into each payload class and submit the LOAs separately, allowing expedited staffing of the 10-ton LOA. As of 30 September 1978, the status of each member of the EMTT family was as follows: (1) the basic LOA has been prepared, a new milestone schedule and funding annex are being provided by TARADCOM. After receipt of each, the LOA will be forwarded to TRADOC for staffing and approval; (2) resubmission of the LOA is pending verification of the need for a truck payload of this range. Upon receipt of the Statement of Need, the LOA will be rewritten and resubmitted to TRADOC; and (3) the LOA has been rewritten, staffed with DARCOM, USAREUR, LEA, OTEA and within TRADOC, finalized, approved and forwarded to DARCOM for their approval.

The high-level DA and DOD interest in the 10-ton German M.A.N. truck accelerated the entire program for the 8- to 10-ton EMTT. On 27 April 1978, HQDA issued guidance that the high-level interest in the 10-ton program impacted on other key DOD initiatives. The DOD guidance/direction compressed the decision on the 10-ton truck in order that a source selection recommendation could be made not later than 1 October 1978.

On 6 July 1978, a program review commenced at Aberdeen Proving Grounds. The program review consisted of a description of vehicles, current status and results of tests, a preliminary evaluation of results, RAM evaluation, ILS planning, and a demonstration of the vehicles at the Munson test course. On 17 July 1978, HQDA conducted a special review to further assess the program and provided Dr. Percy Pierre, the Assistant Secretary Army (RDA), information upon which to base a procurement decision. Based on this special review, HQDA published guidance to the development community on 21 August 1978. Dr. Pierre decided to pursue a normal and more orderly acquisition process.[33]

Container Equipment

50,000-Lb Rough Terrain Container Handler. The Materiel Directorate participated in a meeting at the Mobility Equipment Research and Development Command, 21 November 1977, to discuss the Development Plan and Procurement Plan for the 50,000-lb container handler. Agreement was reached on the beach mobility, RAM, and fording characteristics.

Another meeting held at MERADCOM, 2 March 1978, discussed transportability problems anticipated with the 50,000-lb container handler. It established maximum acceptable height, width, and length of the item as well as the maximum weight of any single component.[34]

XM871 22-1/2-Ton Semitrailer. During November and December 1977, the Nevada Automotive Test Center conducted additional tests on the XM871. The ROC for the XM871 was reviewed, and the decision made that the M127 semitrailer would be modified to transport fully loaded 22 1/2-ton containers, and selected to fill the XM871 role.[35]

Universal Engineer Tractor (UET). During FY 77, the Center assisted the US Army Engineer School in the formulation of their independent evaluation report. In addition, the Center provided the USAES review comments for the UET COEA and for a recommended TRADOC Development Acceptance In-Process Review (DEVA IPR) position. TRADOC recognized that the UET, as configured, had not met all the essential characteristics of the Qualitative Materiel Requirements (QMR) and that type classification entailed certain risks. However, a delay in fielding the UET represented a greater risk of not being capable of accomplishing the missions assigned to combat engineer units in the mobility, countermobility, survivability, and general support roles for both offensive and defensive operations.

The DEVA IPR was conducted on 26-27 January 1977 and type classified. During acceptance testing, it was determined that a 250-hour quarterly preventative maintenance checks and services (PMCS) was too long an interval. USAES recommended a 125-hour PMCS for evaluation purposes during post production testing of the UET. LOGC reviewed the USAES PMCS proposal and provided comments. The LOGC/USAES submitted a coordinated proposal to PM in March 1977. Joint LOGC/USAES participation in Test Integration Work Groups (TIWGs) continued during the rest of FY 77; however, due to a lack of DA funding for FY 78, the program slipped approximately 10 months.[36]

Family of Military Engineer Construction Equipment (FAMECE). During FY 77, LOGC participated as a member, in conjunction with USAES, of the quarterly TIWGs and Integrated Logistics Support Management Team (ILSMT). Prototype qualification test-contractor began in the 2d Qtr, and in coordination with USAES, the scoring committee developed and approved

the failure definition and scoring criteria. LOGC participated with and assisted USAES at three separate scoring conferences. At the request of USAES, logistics issues and criteria were developed, internally coordinated, and forwarded to TRADOC. TRADOC concurred with the LOGC input and forwarded the logistics issues and criteria to OTEA. The RAM data collection program formulated by LOGC, in conjunction with USAES and the USAARENBD during FY 76, commenced during 1st Qtr FY 77. Assistance was rendered USAES and USAARENBD in reviewing the documentation of the ongoing program. OT II commenced in April 1978, and concluded that September. As a member of the COEA SAG, the LOGC continues to assist the USAES with the logistics aspects of the study.[37]

Doubts cast by recent observations and test reports of OT raised questions about completion of R&D of FAMECE. This situation, coupled with the austerity of the FY 80 budget, caused elimination of FY 80 funding of FAMECE by the RDAC. However, a Joint Appropriations Committee meeting held on 8 October 1978, funded 18 million of the 24 million dollars asked for by DA for FY 79. The IOC was planned for 1st Quarter, FY 81. This Center continued to assist the USAES with the RAM and logistical aspects of this program.[38]

Family of Silent Lightweight Electric Energy Plants (SLEEP). A Validation IPR in May 1978 approved entry into the full-scale development (6.4) phase pending completion of the COEA. The LOGC Materiel Systems Directorate, in conjunction with the USAQMS, provided a draft coordinated input for the SLEEP COEA Methanol-Water Evaluation to the USAES.

LOGC also assisted the USAES in drafting and presenting a preliminary logistics support analysis substudy to the SAG. DA offered a revised Basis of Issue. As a result, the Concepts and Doctrine Directorate proposed a new logistical concept for the distribution of Methyl Alcohol/Water mixture fuel for the SLEEP fuel cells and recommended several reasonable alternative distribution systems. The alternatives included palletized loads of 5-gallon cans, nonreturnable 55-gallon drums and smaller containers, returnable 55-gallon drums and smaller containers, and bulk fuel distribution. As used in the concept, the levels of conversion from GED units to SLEEP units consisted of (1) Brigade Forward; (2) Europe 1 for 1; and (3) Worldwide 1 for 1.

To insure water purity, the concept required that the mixing operation be completed at the manufacturing point and placed in 55-gallon drums. The drums were then loaded (40 drums per 20-foot container) and transported by normal transportation. Handling of 55-gallon drums forward of the container grounding area caused handling and transportation problems. USAQMS stated that the S&T Bn required three additional 2 1/2-ton cargo trucks, three additional 4,000-lb rough terrain forklifts,

and six drivers. Other items required to satisfy pumping and storage functions were unknown, such as the extent of incompatibility between the methanol and standard fuel handling and storage equipment. The USATSCH reported that generally little or no problems are envisioned in the Brigade Forward and the Europe 1 for 1 replacement levels. The USATSCH recommended no additional equipment. The third level of replacement, Worldwide 1 for 1, cannot be evaluated due to insufficient information. The LOGC attempted to determine generator density and forecasted consumption rates using the European Theater as a basis for evaluating a bulk distribution alternative.

The USAES proposed staffing a final COEA report in December 1978, with a SAG meeting shortly thereafter. However, a discrepancy appeared in DARCOM costing data. The new increased Basis of Issue created an increase per unit cost from the commodity command, contrary to an anticipated cost reduction. Additionally, DARCOM delayed funding of the 6.4 phase until FY 80. The DEVA IPR decided to convene a special IPR in 2d Qtr FY 79, or within 90 days after approval of the family COEA, to evaluate the COEA results. The LOGC/USAES requested the following additional requirements at the DEVA IPR: the acquisition plan and coordinated test program be completely revised and updated prior to the special IPR; RAM data be reevaluated; the outline test plan include a coordinated test plan for OT II; and recommend convening of a logistics planning group (in accordance with AR 750-1), since the critical logistical issues are the heart of the program. The Center continued to assist the USAES in this program.[39]

Aviation Systems

Recommendations of the previous year's survey of the Army's combat aircraft and crew needs for FY 77-86, Aviation Requirements for the Combat Structure of the Army (ARCSA III), were approved in FY 77. The first such survey since the Southeast Asia-Focused ARCSA II of 1967, this major 1976 survey took up questions bearing in particular on the helicopter's new antiarmor prospect and roles. After results were briefed to DA in September 1976, that headquarters appointed a TRADOC-FORSCOM-DARCOM-DA staff group to recommend changes based on ARCSA III. On 15 February 1978, the Army Chief of Staff approved plans to implement the recommendations.[40]

Advanced Attack Helicopter. Advanced development of the advanced attack helicopter (AAH) YAH-64 culminated in Army and Defense reviews on 4 and 7 December, which approved entry of this advanced craft into full-scale engineering development. On 10 December, a $317.7 million engineering development contract went to Hughes Helicopters.

As a member of the Integrated Logistics Support Management Team, the LOGC participated in the initial meeting of this team in September 1977. Now in the 22d month of a 56-month development schedule, the YAH-64 program was on schedule. During the period January 1978 through December 1978, Design Support Test, Development Support Test, and Development Flight Tests were conducted on a combination of the air vehicles.

Full-scale engineering development of the YAH-64 continued with the next milestone being the ASARC/DSARC III. The primary missile of the YAH-64, the HELLFIRE missile entered the full-scale engineering phase. The Target Acquisition and the Designation System (TADS) and the Pilot Night Vision System (PNVS) started the demonstration and validation phase with two contractors competing for the contract. From January 1977 to October 1978, ILSMT and LSAR meetings have been conducted every 120 days on all three systems, with the next LSAR for the HELLFIRE scheduled to be completed the last week in October. The next ILSMT meeting for the YAH-64 was planned for 5-6 December 1978.[41]

Black Hawk. The troop-carrying UH-60A Utility Tactical Transport Aircraft System (UTTAS)--renamed the Black Hawk on 7 September 1977--entered the full-scale production phase. A major advance in design and maneuverability over the UH-1 series, the Black Hawk carried a full combat equipped squad of eleven, plus a 3-man crew. It was also designed to evacuate wounded and to perform other transport functions.

The UTTAS competitors' (Boeing-Vertol and Sikorsky) prototypes completed DT/OT II testing and underwent source selection early in FY 77. The Sikorsky UH-60A won the competition and was type classified standard by a Defense Systems Acquisition Review Council (DSARC) III held in November 1976. The initial contract called for fifteen UH-60A's by 1 January 1979. Initial Operational Capability (IOC) will be achieved when these 15 aircraft are delivered to the 101st Division. An Integrated Logistics Support Management Team was formed, with the Logistics Center as a member, and the team held meetings in February and June 1977. The primary LOGC involvement in these meetings concerned the Reliability Improvement Warranty program.[44]

Environmental testing of the BLACK HAWK during the period June 1978 thru November 1978 included (1) Tropic Test: June - August 1978, and (2) Desert Test: August - September 1978. During the period June 1978 thru January 1979, the US Army Aviation Engineering Flight Activity conducted Airworthiness and Flight Characteristics evaluatiors.

The first production UH-60A BLACK HAWK was delivered to the 158th Aviation Battalion in August 1978. The first of eight UH-60A to be used in the Force Development and Experimentation (FDTE) to be conducted at Fort Campbell, Kentucky, the Army Aviation Test Board conducted the test

with the 101st Airborne Division as the test unit. The test was designed to examine the adequacy of the TOE and the quality of training provided by the TRADOC schools to support the BLACK HAWK.[43]

Remotely Piloted Vehicles (RPV). The RPV technology demonstrator started to fly again in August 1976 after a 4-month hiatus to correct problems associated with the recovery system. Lockheed Aircraft Corporation built an additional 14 RPV (AQUILA) aircraft for project "SEEKER."

In a Joint Working Group, the TRADOC community provided input data as requested by AVRADCOM for the completion of Section VI of the Outline Development Plan. This data was integrated into the ODP during the August/September 1977 timeframe. The proponent assisted by US Army TRADOC Systems Analysis Activity and other TRADOC and DARCOM elements provided input for the January 1978 COEA. The Center assisted the ROC revision by providing RAM assistance.

Fort Leavenworth, Kansas, hosted the final COEA Study Advisory Group meeting on 28 August 1978. The SAG approved the COEA, finding the logistics and RAM acceptable. A September IPR and DA brief marked the end of the conceptual phase of the RPV development.[44]

Field Artillery Systems

In past years, US self-propelled artillery offset partially the great advantage in artillery, in quantity and range enjoyed by the Warsaw Pact forces. Soviet artillery outnumbered US systems three to one, Army officials noted in testimony for FY 78 budget proposals to the House Armed Services Committee early in 1977. US forces possessed no fielded weapon at all equivalent to the Soviets' widely deployed multiple rocket.[45]

General Support Rocket System (GSRS). To correct this imbalance, American Scientists designed a multiple launch rocket system. In September 1975, DA approved a letter of agreement for a General Support Rocket System for high-volume nonnuclear indirect fire to supplement cannon artillery during massive troop, armor, and artillery attack. Studies of the concept followed. The LOGC chaired the logistics section of the special study group.

The basic vehicle belongs to the MICV family. LOGC provided information on the logistics environment for the 1980-85 timeframe and identified those constraints which impacted on design. The Center stressed the compatibility of vehicles, modularity, ease of maintenance, no special tools or test equipment and the supporting organizations expected to be in the field in the 1980-85 timeframe. The Center advised the materiel

developer of the requirement that the rocket size and weight be compatible with standard shipping containers and with materiel handling equipment of the ammunition supply points. The movement of large quantities of ammunition required special LOGC attention.

While ammunition requirements overshadowed other aspects of logistics, they've not been overlooked. The general support rocket system included no unique, unusual or new equipment. The service schools taught all skills required for its support. It required no special or peculiar test equipment. In fulfillment of LOGC's responsibility, the Center influenced equipment selection and system design thus making it fit the Army system, not the other way around.

By cooperating with the associated schools in the early stages of system concept formulation, the LOGC contributed to a system which can be supported logistically, can be supplied with ammunition, and used as intended.[46]

More specifically, TRADOC tasked the System Manager in October 1977, to provide force planning data for the GSRS to DA. In November suspense slipped, and on 31 January 1978, TRADOC requested LOGC assistance in calculating logistics data; i.e., conventional maintenance and ammunition haul requirements for a division and corps GSRS.[47]

The TRADOC System Manager for GSRS presented a pre-Program Objective Management Review Briefing on 27 September 1978 and to Maj Gen William R. Richardson, DA DCSOPS, on 28 September 1978; LOGC representatives attended the briefings. The TSM recommended the preferred GSRS organization, the operational concept, and logistics, to include ammunition. The LOGC disapproved the logistics information presented and so informed General Richardson. The TSM amplified further the TRADOC concern that logistics, as it pertains to the GSRS, represents a limiting factor on the number of GSRS to be procured for the Army.[48]

General Support Rocket System (GSRS)/Multiple Rocket Launcher System (MLSRS). France, Germany, the United Kingdom, and the United States will co-develope the GSRS. They signed a Memorandum of Understanding in November 1978 and ratified it in January 1979. The joint development MOU included common maintenance and logistics structure. The Joint Logistics Work Group met at Redstone Arsenal, AL, the week of 18 September 1978 to develop terms of reference and a logistics subcommittee charter within the context of the draft MOU. The next meeting of the JLWG was scheduled for 5-11 February 1979 in the UK.[49]

Manportable Common Thermal Night Sights (MCTNS) Contact Support Set (CSS). The 5/4-ton with S-250 shelter provided onsite support (battalion trains area) for the TOW and DRAGON weapons systems. With the fielding

of the MCTNS, additional onsite work was introduced with a concurrent requirement for additional facilities to provide required support under the Night Sight Support Concept. US Army Missile Materiel Readiness Command developed and demonstrated a new CSS utilizing an S-280 shelter on a 2 1/2-ton truck. This provided the required space, environment and facilities for TOW, DRAGON and MCTNS on-site repairs, tests, and work space. The DRAGON Night Tracker OT II underwent a CSS test during July and August 1978, at Fort Benning, Georgia. The maintenance concept required that the CSS provide a DS capability in the battalion trains area. The TRADOC community provided comments to the LOGC to determine viability of the support concept using the new CSS facility.[50]

DRAGON Launch Simulator Training Device. The Launch Signature Simulator (LSS) provided the effects associated with the launch environment of the DRAGON weapon. The Infantry Board conducted OT I at Fort Benning, Georgia, in March/April 1978. The equipment was added to all DRAGON training sets.[51]

TACFIRE. The protracted development of the tactical fire direction system continued with considerable activity during FY 77. Using automatic data processing equipment and programs to automate selected field artillery command and control functions at fire direction centers, the TACFIRE offered significant potential.

An information processing system, TACFIRE aided the battalion and DIVARTY commanders in their support of combat operations. Located at the fire direction centers, it performed target analysis, planned the fire missions, computed the gunnery problem, integrated meteorological data, displayed the tactical situation and performed several other tasks now done manually. TACFIRE does not replace the technicians or the commander. Rather, it improved the present manual systems.

In February 1977, the US Army Field Artillery School (USAFAS) agreed to perform as the Logistics-Oriented School for TACFIRE; from May through July 1977, the Force Development Test and Experimentation took place at White Sands Missile Range. Development Test III (DT III) occurred there from July-August 1977. Following this test, the 1st Cavalry Div Arty at Fort Hood, Texas, received TACFIRE equipment for on-the-job training prior to the Operational Test (OT) III in January 1978.

LOGC participated in several Test Integration Work Groups for this system as well as the reliability scoring conferences. Due to excessive problems with TACFIRE's electronic line printers, the Meantime Between Failures remained below the required 150-hour Minimum Acceptable Value required by the Qualitative Materiel Requirement document. LOGC continued to actively monitor this program.[52]

Tactical Operations System (TOS). The LOGC became involved actively in January 1977 in the TOS program by attending a Required Operational Capability working group at the Combined Arms Combat Developments Activity. During a prebrief of an early European TOS Fielding Briefing in January 1977, the PM TOS solicited LOGC support on Integrated Logistics Support planning for TOS. The Deputy Commanding General, LOGC, directed that LOGC host an ILS Planning Conference, 22-23 February 1977.

Although the US Army Signal School was designated (Proponent) for the TOS, the Center continued to attend significant TOS meetings and to review logistics-related TOS documents. The Center hosted a JWG to write the TOS required operational capability RAM rationale Annex in September 1977. A combined Development Test I/Operational Test I/Force Development Test and Experimentation, FM 222, was held at TCATA on 6-11 July 1977. It was felt that this would support an early fielding decision. A 25 July 1977 SAG concluded, however, that FM 222 proved there were numerous problems in the area of overloading, hardware/software failures, and providing usable data which must be worked out prior to any USAREUR agreement to early TOS fielding.

Geared with information from FM 222, a special Army Systems Acquisition Review Council (ASARC) convened in September 1977 to consider recommendations for accelerating TOS fielding. It concluded that RDT&E funds would be used to procure three engineering development model TOS systems. One will go to Fort Hood in FY 79 and the other two will be sent to Europe in FY 81. In early October 1977, several days ahead of schedule, the "full-up" TOS ROC was submitted to HQDA.[53]

Division Level Data Entry Device (DLDED). LOGC forwarded a draft proposed required operational capability to the Combined Arms Center (CACDA) for review by the Battlefield Automation Management Office on 21 March 1978. Six days later, TRADOC directed that the USASIGS assume proponency for DLDED. In April 1978, USASIGS received the DPROC from CACDA. The EA remained to be completed. The LOGC Materiel and Systems Design Directorates assisted the USASIGS in finalizing the DPROC for submission to TRADOC. SIGS rewrote the DPROC during 12-14 September 1978. Primary changes generalized the essential characteristics so that both commercial and/or militarized components could be used. SIGS sent a revised DPROC to TRADOC on 20 September 1978.[54]

Air Defense Systems

PATRIOT. Programed as the key air defense system for the 1980s and beyond, the medium and high altitude PATRIOT air defense missile system continued in engineering development. On 28 October 1976, the PATRIOT Project Management Office (PMO) briefed the LOGC Command Group on a proposal that the PATRIOT Program be accelerated. The proposed program

essentially called for a development schedule the same as in the current program. The overall program accelerated by changes in testing (integrated DT/OT), training (contractor training for first battalion), and support for early systems (contractor supply/maintenance support above battalion).

Maj Gen Charles F. Means, the PATRIOT Project Manager, had very little time during the 2 November 1976 briefing for General DePuy to present the Accelerated Program given to the LOGC Commander and Staff on 28 October 1976. When asked if he approved the Accelerated Program, General DePuy stated he was "willing to consider it."

On 8 February 1977, COL David Smith, Assistant Project Manager for PATRIOT Logistics operations, provided an update briefing to the LOGC commander on accelerated program planning for the PATRIOT Missile System. While General Graham basically indorsed the program, he did not sanction use of contractor personnel in the support and training roles as envisioned by the PM.

On 23 February 1977, LTG Camm, TRADOC DCG, approved the PATRIOT Accelerated Program. At a 17 February Special ASARC, the accelerated program was referred to the Research and Development Advisory Council for funding.

A briefing on a new logistics concept for PATRIOT, called the Maintenance Enhancement Program (MEP), was provided the Cdr, LOGC on 7 September 1978; he concurred with the MEP, proposed by the PM. As General Smith told General Starry, "Reliance on high RAM characteristics and sensitive automated test support equipment has led to a proposal by the PATRIOT Project Manager to eliminate all GS and depot maintenance for that missile system. However, the success of this Maintenance Enhancement Program (MEP) depended on a very optimistic projection for organizational level fault-isolation capability and a very high reliability of system essential equipment. Fortunately, if the MEP proved unacceptable at any point during test, or even during the first 2 years of deployment, the Army had the option to return to limited or full implementation of the original concept of support without an unacceptable risk. The Logistics Center and the Missile and Munitions Center and School actively endorsed PATRIOT development and testing to insure that the system will be supportable under MEP and to insure that an alternative support concept can be implemented should MEP not prove successful.[55]

Vulcan. A special In-Process Review was conducted at Rock Island, Illinois, 31 January 1978, for the purpose of type classifying the Vulcan Air Defense System (VADS) Radar System Tester AN/VPM-2. Initially the coordinated TRADOC position for the IPR was negative.

The VADS Antenna Test Set AN/VPM-1 has been proposed for reclassification to "contingency" followed by withdrawal of assets from the field and to "obsolete," followed by release of materiel to Foreign Military Sales (FMS). The coordinated TRADOC position disagreed with this decision. All issues dictating disagreement have been resolved except for the stated position of several DSUs that retention is necessary in order to perform repairs/alignments of Azimuth and Elevation Synchro Assemblies. Although this work has in fact been done in the field, the maintenance concept required such work be done at depot level. Missiles and Munitions Center and School (MMCS) was the TRADOC proponent.[56]

Improved HAWK. An I-HAWK Product Improvement Program - Test Integration Work Group (PIP TIWG) was conducted at White Sands Missile Range 22-24 September 1976. There have been a total of 12 PIPs programed for I-HAWK. Of the 12 only 7 have been fully funded; PIPs were developed by the materiel developer without reference to the TRADOC community. The materiel developer closely paralleled the current logistics concepts for the I-HAWK system; however, the logistics concepts planned for the Tracking Adjunct System (TAS) PIP represent a radical departure from current concepts.

TAS procurement was held up pending the outcome of further testing. Additional testing resulted in a delay of approximately one year of the fielding of TAS. (A 1-year delay will be in addition to a delay of 1 year necessary to develop hardware to support TRADOC-coordinated maintenance concepts.) Based on the resultant 2-year delay in fielding, the PM attempted to gain TRADOC approval of a less intensive maintenance concept.

An Improved HAWK Disciplined Review was held at Redstone Arsenal, Alabama, 6-9 September 1977. The I-HAWK Disciplined Review raised several issues which were being resolved by the LOGC Directorates. The issues concerned the status of the I-HAWK MACRIT, Materiel Readiness Reporting, and Enlisted Personnel Management System (EPMS) actions. Appropriate LOGC Directorates produced the status of LOGC actions on each issue and provided this to the US Army Missile Research and Development Command (MIRADCOM). During the week of 18 September 1978, LOGC designated MMCS as their representative at a verification review of I-HAWK loader TMs.[57]

ROLAND. The French and Germans developed a surface to air missile system. ROLAND was designed for use against low altitude aircraft targets. The US version of ROLAND to be mounted on the M109 Self-Propelled 155-millimeter Howitzer Chassis. Fully self-contained, each fire unit carried a basic load of 10 missiles; a firing battery of nine fire units when used in a corps.

Built to European design, US ROLAND systems use MIL-standard and MIL-standard high-reliability parts. The guidance for developing US ROLAND stressed the reduction of and the need to stay within the schedule provided by Congress. An OSD review in mid-1978 released funding for long lead-time items.

LOGC's primary objective insured that ROLAND was deployed with the optimum support capability. This capability required maintenance of the missile general support system. Consequently, ROLAND incorporated its own system peculiar test equipment at the direct support level.

The countries participating in the ROLAND Program (France/Germany/US) established a Joint ROLAND Control Committee (JRCC) to insure a coordinated development process for ROLAND. The JRCC has a number of subcommittees which convene every 4-6 months in the participating countries. The LOGC is one of the three US members of the Joint Logistics Subcommittee.

The contractor directed a Preliminary Design Review of the ROLAND Field Maintenance Test (FMTS), 1-2 February 1977. The FMTS consisted of off-the-shelf commercial computer and test hardware.

TRADOC requested a LOGC briefing on ROLAND, covering LOGC involvement in the ROLAND development program and the complete logistics package, to include current and envisioned problems. The LOGC representative to the Fifth Joint Logistics Subcommittee meeting in Paris (25-29 April 1977) presented a briefing to the French and Germans on Future US Army Missile Support. On 9 June 1977, the Center won TRADOC approval for the MMCS to replace the LOGC on the ROLAND JLS.

Because of the rather limited capability of the FMTS, a great deal of work must be done between DT/OT II and the Confirmatory Test to make ROLAND logistically supportable. The ROLAND trainer (one per battery) cannot be supported by the FMTS and required a separate support-level test set of its own.

As the new TRADOC representative to the ROLAND JLS, MMCS invited the LOGC to attend the next meeting in Bonn, Germany, 17-19 May 1978. The LOGC declined. However, the LOGC provided briefings on ROLAND calibration and historical log forms for the Seventh JLSC meeting in Bonn, Germany. In spite of the progress, General Smith lamented the "lack of interest in supportability" for programs such as ROLAND. "Early in the US ROLAND program," the LOGC Commander noted, "a decision was made to build the US system of high-reliability parts different from those used by the Europeans. It apparently was not recognized at the time that this decision effectively eliminated the possibility of joint logistics support and exchange of parts for the repair of systems." Consequently,

Smith concluded, "one of the major presumed advantages of the ROLAND program, easy, multinational logistics support, will not be fully realized."[58]

Division Air Defense Gun (DIVAD). Development of a new air defense gun to replace the 20mm VULCAN in the 1980s proceeded in cooperation with DARCOM under a letter of agreement of June 1975. On 4 August 1976, DA approved a ROC calling for a 30 to 40mm weapon on an armored chassis with modern radar directed fire control. At a DIVAD Pre-ASARC, held at TRADOC, 7 January 1977, GEN Camm expressed concern that the DIVAD Gun Cost and Operational Effectiveness Analysis would not be complete prior to the ASARC on 28 January and stated the data presented was not convincing without it. He recommended that an abbreviated COEA be utilized as an ASARC data input. The ASARC reinforced the need for the DIVAD Gun, determined acquisition strategy, selected the chassis (M48 or M60A1) and picked the caliber (30, 35, or 40mm).

Both BG Burdeshaw and LTG Camm felt that the logistics and training aspects of the DIVAD Gun Pre-ASARC were overemphasized and did not contribute to the decision-making process. Their position contradicted the guidance given the US Army Air Defense School (USAADS) by HQDA. The contractor reviewed the DIVAD Request for Proposal (RFP) and provided comments to TRADOC. The logistics concept of the RFP conflicted with the latest requirements documents in the area of maintenance: DS maintenance performed by the maintenance battalion vice DS maintenance performed by a platoon organic to the air defense artillery ADA battalion.

General Dynamics and Ford Aerospace and Communications Corp undertook the development of separate DIVAD systems. Both contractors proposed two-barrel gun systems, one a 35mm, and the other a 40mm system.

A Defense Systems Acquisition Review Council convened 6 January 1978 to revalidate the DIVAD Gun program prior to issuance of final contracts to contractors. GD and Ford entered into a 29-month competitive development program followed by a 3-month DT/OT. HQDA and OSD received a prebrief of the GEPARD vs DIVAD Gun issue.

The first quarterly DIVAD Gun update briefings took place in May 1978. The DIVAD Gun's development employed an "accelerated design" (hands-off) concept and a quarterly update to keep interested governmental agencies up to date on the program status. Due to the competitive nature of the development program, all briefings were considered "Competition Sensitive."

On 19 September 1978, DARCOM hosted a DIVAD briefing. During this meeting, the DIVAD PM attempted to solicit a decision from GEN John R. Guthrie to amend the current DIVAD Gun development contract to include

ILS development as part of the Phase I development contract. GEN Guthrie declined to permit amendment. The DIVAD PM formed a training and logistics working group to develop an ILS program for the Phase II portion of the DIVAD Gun.[59] Action continued with a (mid-December 1978) completion target date.

AN/TSQ-73 Missile Minder. The air defense command and control system, AN/TSQ-73, the "missile minder," a completely self-contained, automated facility to command and control activities of Army Surface-to-Air Missile units, was designed to provide command and control to HAWK and HERCULES firing batteries through the application of Automatic Data Processing. When deployed to Europe it will be tied to the NATO Air Defense Command and Control System.

Developmental testing continued apace and on 4 October 1976, OT III testing in Florida utilized a European scenario. Three AN/TSQ-73 systems went to Richmond Air Station, Carol City, and Key West, Florida, with GS located at Richmond Air Station. During the actual cooperative tracking tests, the Key West defense ran into severe difficulties due to improper Identification as Friend or Foe (IFF) programming of the player aircraft by the Federal Aviation Administration. Overall logistical effort appeared to be successful. The US Army Operational Test and Evaluation Agency hosted the second AN/TSQ-73 OT III RAM Scoring Conference, 17 and 18 January 1977. The conference agreed not to aggregate DT and OT data because the mission profiles neither correlated nor contained adequate statistical data.[60]

A Production Validation IPR package recommended type classification standard and full-scale production. The IPR concluded that the system is sufficiently developed to adequately perform its mission. The AN/TSQ-73 Fielding Plan was reviewed and comments forwarded to the PM.

Follow-on Evaluation 1 on the AN/TSQ-73 system took place in the Homestead/Miami area during the period 14 November through 14 December 1977. This FOE verified that improvements were made in shortfalls noted from OT III in the areas of tracking, IFF or Reliability-in Flight (RIF) functions, excessive no-fault-found-indications, operator alerts and draft technical manuals. The PM indicated that many of the problems associated with the test were due to inadequate radar inputs. (Testing was accomplished utilizing inputs from the Hercules HIPAR and an adequate radar does not exist for use with the AN/TSQ-73 Command and Control System.)[61]

Other Combat Systems

LOGC was active in several special categories of combat systems--mines, mine clearing systems, fuel air explosives, mine neutralization systems, mine clearing charges, blasting agents, and demolition kits.

Family of Scatterable Mines (FASCAM). On 6 January 1977 and 28 April 1977, CACDA conducted FASCAM COEA SAGs to review the methodology of the study plan and the scope of the LOGC logistics input. The FASCAM COEA recommended the preferred mix of scatterable mines. The LOGEX contribution to the study effort determined the logistics system's capability to meet the added demand placed on it by the introduction of the new scatterable mines. On 23 September 1977, the LOGC completed its logistics analysis and forwarded the results to the Combined Arms Center. The LOGC concluded that the new family of scatterable mines is logistically supportable.[62]

Underwater Antivehicle Mine (UWAVM). On 21 June 1977, the Engineer School forwarded for review a draft LOA for an Underwater Antivehicle Mine. The mine was planned for use against vehicles swimming or snorkeling across inland waterways. The LOGC conducted a coordinated review of the LOA and furnished comments back to the Engineer School on 31 August 1977.[63]

Artillery Delivered Anti-Personnel Mine (ADAM). ADAM just completed DT III and the production validation is scheduled for April 1979. Although DT/OT III was eliminated from the life cycle, it was included in the Remote Anti-Armor Assault System and ADAM to maintain the original scheduled evaluation.[64]

Manually-Emplaceable Mine System (MEMS). On 15 June 1977, the Engineer School forwarded for review a draft LOA for a Manually-Emplaceable Mine System. The LOA established the need for a new generation of mines which can be quickly dispersed or buried either by hand or machine. The anti-tank and anti-personnel mines were based on the same technology as the related development of the new family of scatterable mines. The LOGC conducted a coordinated review of the LOA and furnished comments back to the Engineer School on 5 August 1977.[65]

Surface Launched Unit, Fuel Air Explosive (SLUFAE). The SLUFAE system continued in advanced development during 1977. Major activity centered around the TRADOC Concept Evaluation for a logistics support vehicle--conducted during 13 June - 29 July 1977. The evaluation determined the best procedures for resupplying rounds from the ammunition supply point to the SLUFAE launcher. At a TIWG held on 31 August 1977, the TRADOC proponent (Engineer School) formally recommended the alternative which makes use of a 5-ton cargo truck fitted with an articulating boom crane. A revised ROC and SLUFAE was prepared by the Engineer School incorporating this, as well as other changes agreed to since the original ROC was approved on 24 March 1975.

In October 1977, DT II started at both the Cold Regions Test Center and Yuma Proving Ground. Fuze problems uncovered early in the testing

have been resolved. On 18 November 1977, coordination and review were completed on a revised ROC for the system. Comments providing guidance in RAM and other areas went to the Engineer School.

Concurrently, LOGC participated in a COEA effort which considered the mine roller and two explosive line charges as other alternatives. At a SAG meeting on 22 November 1977, discussion centered around the comparative costs of SLUFAE and the other alternatives. During the meeting, the SAG added a fourth alternative to be considered, the British Giant Viper, which is another type of explosive line charge. Subsequent to the SAG meeting, LOGC coordinated the preparation of a logistics analysis of the Giant Viper.

At a special meeting held at MERADCOM, Ft Belvoir, Virginia, on 12 April 1978, to review the SLUFAE Final Qualitative and Quantitative Personnel Requirements Information discussion centered on the best MOS to perform DS maintenance on the Launcher. MOS 45L, Artillery Repairman, was the original choice earlier in the development of the system and appeared on the provisional Qualitative and Quantitative Personnel Requirements Information staffed in 1977. However, MERADCOM changed it recently to MOS 62B, Construction Equipment Repairman and suggested a return to 45L MOS. The maintenance allocation charts for SLUFAE were also reviewed and changes made which would reflect changing the maintenance tasks from 62B to 45L.

In May, the TRADOC proponent school proposed that OT II for the system be delayed to permit additional time for development of OT II player training packages, application of DT II fixes to the OT hardware, and revision of manuals. At meetings at MERADCOM on 30 August and 27 September 1978, final coordination was affected to complete all OT II preparations. An OT II start date of 1 May 1979 was tentatively selected.[66]

UK Giant Viper (MICLIC) Mine Clearing Line Charge. The LOGC participated in the evaluation of the Giant Viper as an alternative replacement for SLUFAE. The UK conducted hot humid climate tests in India. The developer undertook a cost assessment and promised it for November 1978. The LOGC was scheduled to participate in the SAG.[67]

Portable Mine Neutralization System (POMINS). On 7 June 1977, the Engineer School forwarded for review a draft LOA for a Portable Mine Neutralization System. The LOA established the need for a lightweight, man-portable explosive device capable of creating a mine-field breech of about 30 meters in depth and wide enough for a soldier to walk or run through. The Center coordinated review of the LOA on 3 November 1977 and forwarded comments to the proponent, USA Engineer School. A lightweight, man-portable explosive device capable of creating a minefield

breech of about 30 meters in depth and wide enough for a soldier to walk or run through. The system replaced the bangalore torpedo.

The US Army Test and Evaluation Command evaluated POMINS to insure that the system met US safety standards. The procurement of systems for additional testing continued with the receipt of a safety release. The LOGC reviewed the ICP and participated in SAGs as necessary.[68]

Ground Emplaced Mine Scattering System (GEMSS). The GEMSS DT II started in January 1978; however, performance deficiencies in the hydraulics system resulted in a suspension of the test in February 1978. In February and March 1978, Red and Blue Teams conducted investigations into the reasons for the deficiencies at a TIWG on 22 March 1978, the PM noted that the basic design of the GEMSS is sound and the problems are well defined and correctable.

LOGC attended a TIWG on 23 August to review the results of the XM128 technical improvement plan and to update the schedule for re-entering Prototype Qualification Test-Government with the dispenser. The Center hosted a meeting in September 1978 of the combat/training developers involved with GEMSS for the purpose of establishing required program efforts and milestones leading for NET for OT II. USAES completed an Independent Exchange Plan (IEP) in August and sent the plan to TRADOC for approval. The LOGC was designated as a voting member of the scoring conference and was scheduled to attend a pre-scoring meeting at TECOM in October 1978. OT II was planned for June 1979.[69]

Blasting Agent. In December 1977, the LOGC arranged with MMCS and applicable LOGC directorates to formulate the LOGC position at a Validation IPR. On 5 January 1978, the IPR was held by Picatinny Arsenal, NJ; all voting members recommended that the Blasting Agent enter the Full Scale Development Phase. IPR discussion centered around updating the Development Plan, establishing safety requirements, and studying environmental impacts.

A coordinated review of the draft "-14" TM and Sections V and VI of the Development Plan was completed in March 1978. Routine comments were forwarded to the Project Manager. On 29 March 1978, a LOGC review of the Coordinated Test Program resulted in a comment to the Project Manager[70] that both the unmixed and mixed ingredients must undergo safety testing.

Demolition Kit, Blasting: XM268. In August 1978, an explosion involving 126,000 lbs of DBA-22M occurred at Sierra AD. Because the Demolition Kit, Blasting, contained this explosive materiel, DT/OT II testing ceased and an investigation was conducted. A special TIWG convened on 12 September 1978. As a result of the meeting, performance testing of the DT II program was suspended and funds were reassigned to

Aberdeen Proving Ground to support engineering evaluation tests. The storage test currently underway at US Army Tropic Test Center and Yuma Proving Ground continued. The results of the cratering testing to date with the Blasting Agent (BA) have been very good and appear to be exceeding the requirement. The exothermic reaction must be resolved before BA can be acceptable to the user. The Phase III testing at the Harry S. Truman Dam Site was changed to another site. A three component system was acceptable to the user if required as a solution to the current problem.[71]

Nuclear Weapons. A letter, dated 18 March 1977, from HQ TRADOC to the LOGC, reaffirmed the role of the LOGC and nuclear weapons. TRADOC assigned the LOGC responsibility for ILS for nuclear weapons and for coordinating this effort with the USA Nuclear Agency, proponent schools, DARCOM, and other agencies. LOGC directed its effort at the correction of safety criteria that had been proposed for nuclear weapons; i.e., RAM and safe altitude criteria.

LOGC initiated working level activities for nuclear weapons at Sandia Laboratories (Kirtland AFB, NM) the week of 1 August 1977 and this related to the XM753 Artillery Fired Atomic Projectile 8-inch XM753. Three other nuclear weapons were also in the proposal and developing phases of their life cycle.[72]

Explosive Ordnance Disposal (EOD) Equipment Test and Evaluation Master Plans. As a result of the LOGC's increasing involvement in EOD activities, the Army EOD Technical Detachment, Indian Head, Maryland, forwarded three Test and Evaluation Master Plans to the LOGC for review of ILS/RAM content. The US Navy EOD facility prepared the documents and covered the Ferrous Ordnance Locator, Shaft Liner Kit and the EOD Steam Generator. RAM considerations were found to be improper and the Navy was advised to make corrections. LOGC actions resulted in increased awareness by the Navy of ILS/RAM requirements.

The worldwide DA EOD Coordinating Group met in late FY 78; the LOGC provided input in resolving procurement and ordering problems concerning the P01 and P08 EOD Tool Kits. The LOGC received a task from the Executive Committee of this Group to set up a special briefing for CG, LOGC on the current EOD Combat Service Support posture. The briefing was scheduled for early FY 79.[73]

Firefinder

AN/TPQ-37 Artillery Locating Radar. The prime contractor, Hughes Aircraft Corporation, continued the R&D effort on the FIREFINDER common shelter. The company obtained a contract for production of the first 32 systems. The initial operational capability is scheduled for June 1980.

AN/TPQ-36 Mortar Locating Radar. The DT/OT II finished successfully in June 1977. Due to recent and continuing high-level interest in this program, it has been elevated to DA major system status. The ASARC III with US Marine Corps participation finished in December 1977, with production approval of 177 systems. Twenty-two of these systems were created for the Marine Corps.

Manportable Common Thermal Night Sights (MCTNS). The MCTNS program aimed at the development of night sights using common thermal imaging technology for the TOW and DRAGON missile systems, the ground locator laser designator (GLLD) and a night observation device long range (NODLR).

Development and operational tests II were conducted in FY 77 with successful results for the TOW and GLLD night sights and the NODLR. A development IPR was held 28 June 1977 at Redstone Arsenal, Alabama. The IPR resulted in a standard classification with an IOC date set for CY 78. Separate conferences were conducted to address the logistics to insure support capability at IOC.

The DRAGON night tracker, while utilizing the common technology, followed a separate development schedule due to design problems inherent in the first prototype models. The initial prototype model (bolt-on) proved too fragile to withstand the firing environment which resulted in a lower hit probability due to bore sight shift. To overcome this deficiency, the housing was redesigned resulting in an 8-month to 1-year slippage in the schedule. The DT/OT I was successfully conducted in CY 76 and proved the redesigned, reconfigured night tracker eliminated the problem with the bolt-on version. A validation IPR took place at Redstone Arsenal, Alabama, on 27 April 1977 which resulted in a decision to enter advanced development and low rate initial production for a number of sets to meet an early deployment date.

The logistics structure for the MCTNS was designed to provide the required support for all. Test equipment for DS/GS was ordered. Training programs were established to become operational in time to provide the needed expertise when the MCTNS are fielded.[74]

The technology of the MCTNS requires a power source (4.8 VDC) and a method of cooling the cyrostat to detect targets. At the time of decision, DARCOM determined that power would be via rechargeable batteries and cooling via high pressure (6,500 PSI) rechargeable bottles. Employment tactics for the TOW, DRAGON, GLLD, and Night Observation Device, Long Range (NODLR) envisioned primarily a dismounted mode of operation. The logistics concept assigned battery charging responsibility to the organization and bottle recharging to the forward support company of the brigades. The usage rate for both bottle and battery, the size of the bottle recharge station, numbers required, and a desire to get the source as close to the user as possible were deciding factors.

At the time, the logistics concept failed to achieve universal agreement at the time, but it passed based on the capability provided by the thermal night vision devices/sights. A JWG convened at Fort Benning, Georgia, in May 1978, to assess new technology, new equipment (ITV & CFS) and revised employment tactics to determine the impact on the present logistics concept. A closed cycle cooler was demonstrated and appeared desirable for TOW and NODLR application in lieu of the air bottles. Vehicle power conditioners were developed to provide power in lieu of batteries. A throw-away lithium battery under development appeared promising for DRAGON and GLLD application. Throw-away bottles may also be practical and cost effective. Employment tactics changed with introduction of the Improved TOW Vehicles and Cavalry Fighting Vehicles.

These developments caused some degradation in the commonality aspects of support for the MCTNS. They also degraded commonality of the night sights. The LOGC addressed the logistics impact and proposed changes to the logistics concept.[75]

Ground Locator Laser Designator (GLLD). The Artillery Forward Observor used the GLLD to locate and designate targets for the 155mm Cannon Launched Guided projectile and air delivered laser guided bombs. Currently in advanced development and undergoing development and operational test II at White Sands Missile Range and Fort Carson, Colorado. It successfully completed DT/OT I, physical teardown and maintenance evaluation in FY 77. The GLLD was contrived to be supported by system peculiar DS/GS test equipment, MOS 34G, under the proponency of the Ordnance and Chemical Center and School at Aberdeen Proving Ground, Maryland.[76]

DRAGON Launch Signature Simulator (LSS). This training design successfully completed an OT I at Fort Benning, Georgia. This device was developed on a 1970 Qualitative Materiel Requirement. The Infantry School proposed that the scoring conference be held by correspondence. LOGC agreed with the Infantry School recommendation until it surfaced that further testing was not planned and type classification action may be recommended based on the OT I results. Accordingly, a formal scoring conference was conducted.[77]

National Guard/Reserves Forces Test Measurement and Diagnostic Equipment for TOW/DRAGON Deployments (TMDE). DA directed DARCOM/TRADOC address direct and general support TMDE for support of TOW and DRAGON missile systems deployed to the National Guard and Reserve Forces. The response submitted in July 1976 by DARCOM with concurrence of TRADOC proposed that (1) the DRAGON Tracker test set used by the forward maintenance teams for onsite diagnostic equipment be issued to the Reserve Components for direct support with backup support from the Anniston Army

Depot, and (2) that new test equipment, equivalent to the LCSS be procured and issued to the Reserve Components as TMDE for the TOW systems.

The use of the Tracker test set as TMDE for DRAGON in the Reserve Components with backup from the Anniston Depot was approved and equipments to support the concept is on contract. In the case of TOW TMDE, there were competing test sets; i.e., a TOW field test set (TFTS) and an augmented contact shop set (ACSS). Both pieces of equipment appeared to posses the inherent characteristics to meet the requirement. Accordingly, the Infantry Board conducted a comparative evaluation to determine which should be selected. The results were inconclusive and indicated both sets required improvements. In addition, the ACSS required a 2-year development effort to package it to withstand a field environment. This latter factor of availability and complete absence of R&D funds for the ACSS development decided the TFTS.

At a 19 May 1977 IPR, it was decided to procure 72 TFTS as TMDE for TOW deployed to the Reserve Components and separate brigades of the Active Army which did not have access to the LCSS. The same IPR decision directed TFTS improvements; i.e., folded optics for boresight, full support for the training equipment, revision of technical manuals, and repair parts provisioning as part of the procurement contract. It also directed initiation of a technician (MOS 27E) training program for Reserve Component personnel as soon as possible. As a result of the May IPR, 24 TFTS in the unimproved configuration were procured and distributed to Reserve Components. Five sets of repair parts or enough to support 25 test sets for one year have also been delivered to the depots. Manuals were improved and delivered with the test sets.

The one aspect of the IPR position not yet in operation is the training program for the operator/maintenance MOS 27E. The Missile and Munitions School at Redstone Arsenal has an established resident course designed specifically for Reserve Components. The Reserve Components, however, have not identified the number of personnel to be trained, or a schedule of training. A letter was sent by the LOGC Commander in October to the Reserve Components requesting they expedite this action in order to establish an organic support capability for the TOW system.[78]

Reliability, Availability, Maintainability (RAM)

LOGC remained the executive agent for TRADOC on all matters pertaining to RAM (Reliability, Availability, Maintainability). In this capacity, LOGC, Materiel Directorate, RAM Office developed and promulgated new TRADOC RAM procedures for application to combat developments.

The need to determine realistic RAM characteristics which are consistent with system operational and support requirements, current state-of-the-art, Army doctrine, organization, and force structure for Army combat systems resulted in the development/refinement of a computer model called COVERS during FY 77. Its simplistic inputs and outputs provide the action officer with increased capability and flexibility in determining RAM requirements.

The COVERS model examined and evaluated the mechanical attrition of a system and its subsystem as it operated in a given scenario. Mechanical attrition related to those failures of a system due to mechanical breakdown. Combat attrition or losses due to enemy fire was not considered in the model.

Based on Monte Carlo simulation techniques, COVERS used random processes to generate times to failure, times to repair, logistics times, and various probabilities.

Maintenance team repair accomplished maintenance at the organizational and direct support levels of maintenance. Repair at general support was through float exchange. The system and its subsystems required queueing or waiting support at all three levels of maintenance.

Outputs of the model included descriptors of operational performance (operational availability, system and subsystem reliability, etc.), and logistics support (time waiting replacement parts, time waiting maintenance support, replacement parts/POL requirements, etc.).

Of lesser magnitude than the COVERS model was a model developed to assist the Quartermaster School in determining reliability and maintainability requirements for the Tactical Water Distribution System. Using simulation techniques the model analyzed the effects on system effectiveness of reliability and maintainability characteristics. Results of the model were used by the Quartermaster School as justification for the reliability and maintainability requirements included in the requirements document.

Wartime Repair Part Consumption Planning Guide (WARPAC). The WARPAC project represented only one of the Center's projects for the improvement of repair parts support across the full spectrum of the commodity areas. Through WARPAC, the TRADOC schools and DARCOM commodity commands identified what was essential, maintenance-and-supply-wise, to keep significant combat and combat support equipment functioning during a contingency operation. The repair parts identified through the WARPAC process were only the "hard core" items that were required to support such repairs. The Army cannot depend upon peacetime resource allocations and experience to provide a base for contingency requirements. Peacetime constrained

the ASL/PLL, and wholesale stocks, including war reserves, by (1) demand based stockage criteria, (2) number of total lines authorized, and (3) austere funding. As a result, support stocks were at minimum acceptable levels. Therefore, WARPAC provided assistance to commanders and planners in preparing for the transition from peace to war by forecasting, in advance, the increased consumption of repair parts through identification and quantification of the expanded maintenance effort that the contingency will demand. In addition, WARPAC planned today, for tomorrow, because there won't be time before the next war to gear up our national industrial base to support our suddenly increased demands.

WARPAC supplied this information through publication of an individual FM for each significant combat and combat service support end item studied. During 1975 through May 1977, the TRADOC schools and DARCOM commodity commands analyzed 12 end items. Phase II of WARPAC involved the study of 47 more significant end items from all commodity areas and was scheduled for completion in 4th Quarter, FY 79. Phase III, which should begin in FY 80, will cover an additional 24 items, bringing the total to 83 WARPAC FMs.

During WARPAC III, the TRADOC schools and DARCOM commodity commands were directed to analyzed more end items and to address the possible transfer of proponency of the FMs to the materiel developer. WARPAC III studied incorporation of the WARPAC data into the equipment TMs, and required a new revision of the Army master data file essentiality codes and war reserve stockage concept.

In summary, the joint TRADOC, DARCOM, and DA WARPAC project sought to identify potential wartime essential maintenance operations, the parts needed to accomplish them, and the means by which the concept can be applied to our contingency planning needs. It was an essential first step toward the improved planning and management of the Army's war reserve program and served as a catalyst in addressing the entire question of repair parts management based on essentiality indicators which could eventually augment the peacetime demand-rate criterion which now drives the system.[88]

Miscellaneous Materiel Developments

Department of the Army Test, Measurement, and Diagnostic Equipment Preferred Items List (DA TMDE PIL). A Memorandum of Agreement (MOA) between TRADOC and DARCOM formally launched this project in December 1976. This project hoped to upgrade the Army inventory of general purpose TMDE with commercial off-the-shelf nondevelopmental items (CNDI) suitable for use in the military environment with little or no modification. Based on the findings of a Defense Science Board Task Force, this approach capitalized on the technology and logistics base already existing in the commercial market.

In July and August 1978, TRADOC concurred in the type classification "Limited Procurement" of 11 items of TMDE to satisfy urgent requirements. The next IPR was scheduled to consider action to type classify these items "standard" sometime in FY 79.

The LOGC took the lead in coordinating the annual TRADOC review of the MOA leading to extensive revision in the area of user testing and expansion to include all CNDI. The revised MOA remained in abeyance pending finalization of DA regulatory guidance for acquisition of CNDI.[81]

DA TMDE Five-Year Program Plan (FYPP). Originating with previous HQ TRADOC tasking, during the past year the LOGC continued to prepare and submit the two semi-annual TRADOC TMDE Activities Reports which fell due. Although submitted as "TRADOC" reports, each of these reports reported essentially TMDE combat development matters inherent to the current LOGC mission. In July 1977, the LOGC prepared and submitted to HQ TRADOC a command supplement to AR 750-43 and a matrix proposing intracommand responsibility for accomplishing all 21 TRADOC involved tasks.

At a meeting hosted by TRADOC in late January 1978, the TRADOC attendees reduced the 21 command tasks to 13, 5 of them deemed combat development in nature (for which LOGC retained responsibility). TRADOC approved the supplement to AR 750-43 and FYPP matrix on 15 May 1978.[82]

Direct Support Ammunition Maintenance Tool Set (DSAMTS). Early in FY 78, the Missile and Munitions Center and School recommended to LOGC and TRADOC that the materiel developer, Armaments Readiness Command be advised that the user was no longer interested in obtaining the DSAMTS. MMCS based their recommendation largely on the results of the Munitions System Support Study (MS3) in which there is considerable munitions maintenance reduction. However, subsequent analysis of the revised role of the 9-38 Ammo Company revealed that there would still be sufficient ammunition maintenance to be performed which would require some of the tools of the DSAMTS.

By mid-FY 78, LOGC held discussions with MMCS, and they decided that 7 of the original 13 DSAMTS tools were needed to perform the 9-38 mission. They identified this mission as preservation and packaging rather than maintenance; these seven tools supplemented the existing TOE ammunition tool set. By late FY 78, ARRCOM requested that an IPR be held to officially change the DSAMTS. This special IPR was scheduled to be held in October 1978.[83]

New Depot Overhaul Criteria for Combat Vehicles. In response to a June 1977 request from US Army Tank Automotive Readiness Command (USATARCOM), LOGC assisted in the development of new depot overhaul criteria

and procedures for combat vehicles. The revisions implemented reliability centered maintenance strategy which requires an overhaul inspection when a combat vehicle reaches a prescribed mileage. Based on the vehicle's overall condition as reflected in the inspection reports and other documentation, the national maintenance point made the final decision to overhaul.[84]

Trailer Proponency. Traditionally, the US Army Transportation School handled the TRADOC proponency for the M857/M131 series/M129A2C and M349 semitrailers. These semitrailers were special purpose items and were an integral part of the overall supply system within which they must operate. The US Army Quartermaster School retained the TRADOC responsibility for the associated supply systems.

Since the Quartermaster School was the principal user and had the prime input to the performance requirements for subject trailers, the LOGC proposed a transfer of proponency to that school. The Transportation School, Quartermaster School, and all directorates of the LOGC concurred with the proposal. TRADOC granted final approval on 11 October 1977.[85]

Simplified Test Equipment for Internal Combustion Engine Powered Materiel (STE/ICE PM). The STE/ICE PM completed developmental testing III and operational testing during May-August 1978. DT/OT III revealed that prior hardware shortcomings have been collected, user acceptance was highly favorable, and hardware reliability exceeds that required by the requirements document. An IPR convened 26-27 September 1978 and type classified STE/ICE PM as "standard".[86]

Total Logistics Readiness/Sustainability. The DA DCSLOG tasked LOGC's Materiel Directorate in late FY 77 to provide logistics impact information on Total Logistics Readiness/Sustainability. Under an MOU, the TLR/S effort provides updated logistics impacts at specified future dates for specified materiel end items/systems.[87]

M3 Chemical Protective Suit for EOD Personnel. During the latter half of FY 77, LOGC personnel attended a worldwide EOD conference at which a question arose about the shelf life of the M3 chemical protective suit used by EOD personnel. No clear instructions existed on the usefulness of the M3 suit after the expiration date had been passed. Subsequently, TRADOC requested the LOGC investigate the situation. The Center provided the TRADOC EOD POC information on shelf life standards, test criteria, and testing agencies.[88]

Training Devices. Until the 3d Quarter FY 77, LOGC devoted little time to tracking integrated logistics support for army training devices (TD). As a result of MG Graham's direction, the Materiel Directorate

instituted a program to follow the development of certain training devices to insure their logistics supportability prior to system fielding. The first system of consequence happened to be an artillery forward observer firing trainer, appropriately named the Observed Fire Trainer (OFT). It compiled various existing electro-optical-audio systems assembled in such a fashion as to realistically simulate the bursting of all artillery calibers and rounds, projected against a geographically familiar background (scenes from Fort Sill, Oklahoma, and the Fulda Gap in Germany are currently in the system). As originally developed, the OFT lacked sufficient planning in the areas of maintenance, supply, and transportation. The PM TRADE initiated corrective action.[89]

Sets, Kits, and Outfits (SKO). SKOs came under close scrutiny due to an apparent lack of control experienced by both the combat developers (TRADOC) and the materiel developers (DARCOM). TRADOC (LOGC) was tasked to establish a workable, simple, and yet effective method to manage the combat development of SKOs. A newly published (July 1977) TRADOC Reg 702-2 established guidelines for LOGC management and review of SKO. It further established LOGC as the TRADOC executive agency for Army SKOs.[90]

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CHAPTER 4

FORCE STRUCTURE AND TEST DEVELOPMENT

The Standard Scenarios

Inaugurated by TRADOC in 1974 as a way of assessing contemporary and future strength, "the Scenarios provided the Army a common, unifying framework in which to analyze doctrine, organization, and materiel of corps-sized and smaller forces deployed against realistic enemy threats in geopolitical, climatic and terrain conditions of representative world regions."[1]

By dramatizing a wartime setting, the Scenarios assisted TRADOC and its associated centers and schools in improving logistics concepts and doctrine for the modern Army. By September 1976, TRADOC (LOGC) finished several Scenarios, including two Mideast Scenarios (Mideast I, II and IIA), an Alaskan Scenario, and one European Scenario (Europe I, Sequence 2A); a short warning version of Europe I, Europe II Scenario, was partially completed during this period. The results of these Scenarios "widely affected Army thinking about tactical doctrine and forces."[2] The LOGC played an important role in formulating a policy for them and during this period, FY 77 and FY 78, participated in several of them.

Theater Level Scenario. The Theater Level provided a common framework of selected situations and real world conditions in which specified US Forces were deployed. Having previously incorporated Echelons Above Division-Extended doctrine, the Force Analysis Simulation of Theater Administration, and Logistics Support (FASTALS) of the Concepts Analysis Agency (CAA), the Theater Level Scenario required further modification on unit allocation rules and theater locations. Additionally, LOGC developed consumption factors and stockage objectives for input to FASTALS. These foregoing actions facilitated a preliminary output which went to all the combat service participants in mid-December 1976, for fine-tuning for rerun prior to a final product.

Modernization of the FASTAL's master file in early January permitted round-out and printout of EAD-X theater logistics structure. In late January, CAA held a workshop on the computer output. All CSS participants shared in this analysis. From April through July, there was a major effort for review and coordination of input by LOGC associated centers and schools, US Army Administration Center, the Academy of Health Sciences, and other CSS centers and schools to publish an initial draft of Volume II by 6 July 1977. TRADOC approved the Theater Level Scenario as a "standard scenario" on 29 July 1977. The final draft,

Volume II, was published on 26 August 1977 and distributed soon thereafter. "Once completed and validated," argued the Army Logistician, "the TRADOC theater-level scenario will provide a valid reference document for theater-level data of a nature not developed in the corps-level scenario. More important, as new developments in weapons and, consequently, in concepts and doctrine emerge and require testing, the scenario can be updated by computer, thereby sustaining a current scenario of lasting value."[3]

Europe I, Sequence 2A Scenario. With requirements to use scenario data as a basis for evaluation of TOE developments, as well as to assist in the evaluation of the V Corps, the LOGC decided a SCORES Phase I evaluation was needed for the entire period of the Europe I, Sequence 2A Scenario. The previous Phase I evaluation tasking required that only the first 4 days of the 20-day war game report be accomplished. On 17 October 1977, LOGC tasked its associated schools to evaluate the entire 20-day period. The schools returned their evaluations during mid-January; the Center completed the first draft in February. The final evaluation report was compiled, edited, published, and distributed in June 1978.[4]

Europe I, Sequence 3A Scenario

During March 1977, the US Army Combined Arms Center asked the LOGC to evaluate the Europe I Sequence 3A Scenario, a counteroffensive, to determine if it could be supported logistically. Because of the short suspense, the LOGC associated schools attended a workshop conducted at the LOGC. Gross planning factors were utilized to develop support requirements which were then compared to CSS unit capabilities. This comparison provided observations from which insights were derived. These insights provided a basis for determining if the counteroffensive could be logistically supported. The Center revealed its findings at the General Officers' workshop, CAC, 5-6 April 1977, and then tasked the associated schools to prepare SCORES Phase I analyses of the sequence war gaming. The schools provided them during October, 1977. The Center integrated these findings into the final draft Phase I Combat Service Support evaluation, and then published and distributed it in early January 1978.[5]

Europe Short Warning Scenario. In early October 1977, USACAC set forth an initial scenario planning meeting for a high priority SCORES Europe (NOW) Scenario. This meeting developed the TRADOC tasking package, finalized guidance and the general scenario situation, and laid the groundwork for an early December 1977 war gaming workshop. TRADOC guidance changed the "No Warning" in late February and provided certain other guidance to be incorporated into the scenario. This scenario addressed the concept that the warning will be sufficiently short to preclude troop reinforcements.

On 7 March 1978, a logistics team, consisting of representatives from the LOGC and its associated schools, met at CACDA to prepare a methodology for logistics participation in the war gaming process. It concluded that representatives from each school should be in attendance at any and all future sessions. This scenario's war gaming began on 15 March 1978.

Gaming continued until mid-June with an average of 6 critical incidents planned each day; 22 critical incidents or 3 and 2/3 days were consumed in this phase of war gaming. "For the first time," wrote General Smith, "logistics participation during war gaming was attempted. This enabled the logistics community to get a better feel for what was happening as the scenario unfolded." Smith observed that, "it also permitted a more rapid Phase I logistical analysis to be prepared."[6]

On 29 and 30 August 1978, the Force Analysis Division briefed the General Officers' Workshop at Fort Leavenworth, Kansas, on Europe Short-warning. Selected observations and insights corresponded with previous logistics findings developed during the CSS evaluation of V Corps in Europe. The associated schools provided their logistical Phase I analysis input to the LOGC. The LOGC's written evaluation was scheduled for completion during the 2d Quarter, FY 79.[7]

Europe III Scenario. A significant departure from previous scenarios, Europe III Scenario depicted a two corps operation in Europe in the mid-1980s. "For the first time in SCORES," acknowledged General Smith, "we will be looking at the areas behind the corps (RCZ and COMMZ) and will have an opportunity to evaluate logistical combat developments to include emerging logistics doctrine. The Europe III Scenario will use the major weapons systems expected to be found in the inventory in 1986; i.e., the XM-1 tank and the IFV/CFV family of fighting vehicles."[8]

The first scenario portraying two US Corps, Europe III, was expected to receive high interest and visibility and to develop a follow-on Europe IV scenario. Gathering of data continued within the LOGC and the logistical community to identify and catalogue the mid-1980 equipment and weapon systems that played in the war gaming of this scenario. CACDA scheduled several workshops through the early part of 2d Quarter, FY 79, to finalize troop lists, tasking requirements, and update the planning for the Europe III Scenario.[9]

Korean Scenario. In the fall, 1977, the Korea Scenario evolved with advanced war gaming information gathered from CACDA.

The LOGC associated schools analyzed the scenario submitting their reports on 5 May 1978. The unique nature of the scenario (non-US forces to a large extent) led to a divergence from standard SCORES procedures.

The schools reviewed their areas of proponency to establish the net impact upon the US logistics systems and they examined in detail specific functions not previously studied.

The associated schools and the LOGC completed the Phase I analysis of logistics ramifications during the 4th Quarter, FY 78. The SCORES General Officers' Workshop at Fort Leavenworth, Kansas, received the results of the logistical evaluation of the Korea Scenario in August. Higher priority projects delayed a final written report.[10]

Threat Analysis

The Center conducted a survey of threat requirements in the 1st Quarter, FY 78, and as a result, upgraded the authorized position from CPT, 03, to MAJ, 04. During the year, the LOGC continued to provide major Army commands with information on the Soviet Logistic Systems and contributed major input for a study being conducted at the Army War College. Additionally, the Center furnished individual students from the Army War College, Command and General Staff College, and the Army Logistics Management Center with supporting materials for studies being conducted on individual Soviet Logistics System, such as POL, maintenance, or transportation.

CACDA hosted a Threat Managers' conference on 27-28 June 1978. One major outcome of this conference was the establishment of a CACDA-Run Threat Manager Orientation. All newly assigned Threat Managers attend this orientation. It proposed that threat conferences be held semiannually at CACDA in an attempt to standardize the threats being postulated by the different commands throughout the Army.[11]

Theater Nuclear Force Survivability Program

A project which impacted directly on the Corps was the Theater Nuclear Force Survivability (TNFS) Program. The Department of the Army assigned TRADOC the responsibility of accomplishing an evaluation of the survivability of the theater nuclear forces in Europe. Now in its second year, the project included not only TRADOC, but also DARCOM major commands and laboratories. Assisted by the Admin Center and the Academy of Health Sciences, the LOGC was responsible for the Combat Service Support subprogram. It should be noted that the LOGC established the baseline for the theater combat service support system before the effects of enemy attack on that system could be evaluated.

The BDM Corporation assisted the Center in accomplishing the study effort by employing a derivative of the LOGC model of the worldwide logistics system, entitled, "LOGATAK" or Logistics System Attack Model.

The basic scenario in the initial effort was a SCORES European Scenario, with emphasis on the V Corps in a defensive posture. Preliminary findings indicated the LOGATAK model could effectively model the European logistic system.

The BDM effort included classes of supply and the impact on transportation, personnel and troop movements and medical evacuation. The results of the combat service support evaluation provided numbers which uncovered significant shortfalls in the capability of the combat service support system to support forces in wartime, as well as pointing out vulnerable aspects of the system. It proved to be one of the most significant projects undertaken by the LOGC and provided the basis for many of our future study efforts. The program was scheduled to be completed during FY 81.[12]

V Corps Combat Service Support (CSS) Evaluation

Another project which capitalized on the TNFS work was the Center's evaluation of the V Corps Combat Service Support System. The Center conducted this evaluation in response to a requirement from the TRADOC commander to perform an overall evaluation of the capability of the V Corps Combat Service Support elements to support the corps in battle. The evaluation used the TNFS LOGATAK model just discussed, and comparative evaluations of other past and ongoing efforts to determine CSS adequacy in Europe. The Center developed and analyzed a V Corps troop list as of D-Day; both HQ US Army Europe and the V Corps rendered invaluable assistance. In his welcoming remarks to LOGCAB VIII, General Smith stated it bluntly when he remarked: "I believe that combat service support is the lifeblood of the Army . . . ."[13]

In addition, the work on the evaluation of Restructured General Support furnished insights pertaining to the V Corps Maintenance System. Through this effort and the TNFS work, the Center anticipates acquiring a useful gaming tool and a meaningful evaluation of V Corps CSS capability. The V Corps CSS evaluation provided input to the TRADOC Europe Short Warning Scenario developed by CACDA.

To be realistic, the data evaluated included current information describing the V Corps GSS system, combat forces to be supported, and other current studies and analyses impacting on the V Corps capability. These data determined requirements, shortfalls, or excesses.

A team visited 3d Support Command during the period 26 November - 3 December 1977 on the concepts and plans for the evaluation. The LOGC hosted a workshop on 12-13 January 1978, attended by LOGC associated schools and a representative of the Administration Center for further coordination of the effort. Subsequently, representatives from the

schools and LOGC staff members participated in issue sessions to analyze available data. An intensified effort continued through 6 March 1978 when the LOGC Cdr received an initial briefing. A team visited 3d Support Command 7-18 March 1978 to provide the 3d Support Command Commander with results of the evaluation.

General Starry and key TRADOC staff officers received a final briefing of the logistics portion of the V Corps CS3 Resource evaluation on 3 April 1978; LOGCAB on 25 April 1978; and BG Fred K. Mahaffey, CACDA, on 12 April 1978. An expanded briefing was given to the SCORES representatives from the associated schools. The Admin Center portion of the analysis concluded in July. The final written report is now being prepared.[14]

Exercises

CPX ORBIT PHANTOM II. III Corps conducted Exercise ORBIT PHANTOM II at Fort Hood, Texas, during September 1976. The Command Post Exercise provided realistic training for the commanders and staffs in the planning for and conduct of a corps deployment and subsequent tactical employment as part of a Joint Task Force in support of an overseas non-general war contingency operation. The LOGC directed its attention toward the 13th COSCOM, 43d Spt Gp (Corps), 46th Cbt Spt Gp (Area) plus smaller units. It documented problem areas dealing with supporting a heavy corps in desert operations.

CPX BRAVE SHIELD XV. The 82d Abn Div and the 24th Inf Div conducted Exercise BRAVE SHIELD XV at Eglin AFB, Florida, during October 1976. The primary objective of this exercise consisted of aerial deployment and resupply. Over 108 missions were flown to support the airborne, link up, and resupply operations. All types of aerial resupply underwent extensive exercise.

CPX BRAVE SHIELD XVI. REDCOM conducted Exercise BRAVE SHIELD XVI at 29 Palms, MCB, California during July 1977. Major US Army participants included elements from the 7th and 9th Divisions. The exercise provided excellent training for all CSS units during desert operations.

CPX JACK FROST 77. The 172d Inf Bde and the 3d Bde, 9th Inf Div conducted Exercise JACK FROST 77 in the Fort Wainwright, Fort Greely, Alaska area during January and February 1977. The exercise aimed at performing contingency plans for the defense of Alaska and training in an arctic environment. All CSS units received excellent training that included extensive real world resupply during arctic operations.

CPX CABER WARRIOR IV. The XVIII Abn Corps conducted Exercise CABER WARRIOR IV at Fort Bragg, North Carolina, during March 1977. The CPX involved deploying a light corps to include supplies and equipment by air into an overseas area of operation.

CPX CABER WARRIOR V. Exercise CABER WARRIOR V, the annual XVIII Airborne Corps CPX, took place at Fort Bragg, North Carolina, during the period 8-12 March 1978. The CPX scenario play committed a US Army light corps in response to a likely contingency operation. The timeframe for the CPX was 1980. The CSS play encompassed the COSCOM and its Support Group. ARNG/USAR units participated to bring the number of CPX participants to 6,855. The scenario provided a challenge for all CSS as it was most realistic and allowed the logistical elements to analyze their ability to support and provide sustainability to the combat force.

CPX GALLANT CREW 77. III Corps conducted Exercise GALLANT CREW at Fort Hood, Texas, during March-April 1977. The exercise provided excellent training for commanders and staffs on planning for the deployment and employment of a heavy corps in an overseas area of operation. The extended distance between the combat forces (Fort Hood), forward support group (Temple) and 13th COSCOM (Austin) added realism to the exercise and tested the CSS procedures and system for reporting, resupply and communications.

CPX REFORGER 77. Exercise REFORGER 77 was the annual JCS exercise deployment element of the 1st and 4th Inf Divisions to the European theater of operation. An EED representative observed the CARBON EDGE (FTX), a portion of REFORGER 77. CSS elements received excellent training in both deployment and supporting a corps-size combat force in southern Germany.

CPX SOLID SHIELD 77. Exercise SOLID SHIELD 77 was played out by CINCLANT at Camp Lejeune, North Carolina, during May 1977. The exercise, 10th in this series, emphasized command and control in a unified command environment. Major US Army participants included the XVIII Abn Corps, 1st COSCOM and 82d Inf Div. The exercise applied the CSS resupply concept to an Enticement and Encirclement Anti-Armor oriented scenario. It adopted and updated procedures for resupplying forces in a joint operation.

CPX BOLD EAGLE 78. The US Readiness Command conducted Exercise BOLD EAGLE 78, a Joint Readiness Exercise (JRX), involving some 20,000 Army, Navy and Air Force personnel, at Eglin Air Force Base, 23 October through 30 October 1977. The scenario called for putting support elements, an air cavalry unit, one artillery battalion, and three airborne infantry battalions, making up an infantry brigade of the 82d Airborne Division against combat service support elements, two armored battalions, an

infantry battalion and a brigade headquarters of the 5th Infantry Division (Mechanized). The 1st Corps Support Command provided support to both opposing forces. The JRX offered an opportunity for participating forces to operate in an environment involving more than one service and to achieve training in joint tactics, techniques and procedures.

JRX EMPIRE GLACIER 78. JRX EMPIRE GLACIER 78 was a cold weather exercise providing joint training for selected ground and tactical air forces of both active and reserve forces. Approximately 12,000 Army, Marine and Air Force personnel trained at joint tactics, techniques and procedures in a cold weather environment. Fort Drum, NY, hosted the action. The JRX consisted of five phases: Phase I, deployment of forces, January 3-23; Phase II, unconventional warfare, January 17-24; Phase III, command post exercise, January 25; Phase IV, field training exercise, January 26-31; and Phase V, redeployment, February 1-15. Throughout the JRX, active Army and Air Force personnel and their reserve components worked together to reinforce the total force policy. Approximately 20 percent of the participants came from the reserve components.

Force Development Test and Experimentation (FDTE)

FDTE underwent three significant actions during this period. With the initiation of the Division Restructuring Study in early 1976, the need arose to develop the optimum size, mix and organizations of the US Army divisions for the FY 80-85 timeframe. A major problem remained: how to integrate and optimize the new weapons system within the tactical concepts for modern warfare to maximize firepower forward at the right place and time. Division Restructuring Study developed a concept envisioning concentrated combat power and highly active units on the modern battlefield, a clear alternative organization for testing of this concept, and a total system attainable within acceptable life cycle costs. The LOGC supported this concept by conducting a logistics evaluation of the restructured division and development of logistical issues. In cooperation with the LOGC associated schools, the Center developed and refined logistical issues in working groups at HQ TCATA. At the conclusion of the FY, the DA staff imposed a change in testing concepts. These questions underwent extensive updating until the actual test date (1-30 September 1978).[16]

Corps Automation Requirements Baseline Identification Test (CARBIT)

With the testing and evaluation of the Corps Automation Requirements Baseline Identification Test (CARBIT) during FY 77, the LOGC defined the current corps Automatic Data Processing baseline for Combat Service Support. It identified and quantified current configuration shortcomings as a basis for upgrading the present COSCOM centralized mobile computer configuration; it also refined organizational and doctrinal concepts for the Echelon Above Division Corps.

In accordance with AR 71-3, the Center developed an outline test plan (approved by the Test Schedule and Review Committee (TSARC) in May 1976) and a test design plan (approved by US Army Operational Test and Evaluation Agency (HQ OTEA) in December 1976); it also conducted an independent evaluation of the test results. The evaluation committee consisted of representatives of the LOGC, ADMINCEN, CACDA, and the SIGSCH. The draft test report was received in early June 1977. The committee apprised the LOGC Commander on the evaluation results in July 1977; the commander approved and dispatched the report in July 1977 to all major commands and DA staff agencies. In addition, the evaluation committee briefed the CAR SAG of the results in August 1977.[17]

Division Materiel Management Center (DMMC)

HQ TCATA conducted the DMMC Test from September 1976 to September 1977. The test provided data and associated analyses for validating the DMMC (TOE 29-3H) for Armored, Infantry, Mechanized Divisions. It evaluated the effectiveness of two DMMC organizations with HQDA concurrence, it approved increased staffing levels and one DMMC at TOE 29-3H strength. The test found that a DMMC with an end strength of 136 personnel performed adequate materiel management in the AIM division during wartime in accordance with current doctrine. An Independent Evaluation Review Committee (IERC), consisting of appropriate LOGC directorates, the associated schools, and the IERC, reviewed the test results and rendered an Independent Evaluation Report to HQ TRADOC on 2 March 1978. The IER stated that the 136 personnel reported in the test report were not sufficient assets to perform materiel management. They recommended an end strength of around 154. The IER end strength was briefed to the LOGC Commander and he concurred with the IER and authorized release to HQ TRADOC.[18]

Concept Evaluation Programs (CEP)

HQ TCATA directed an ASL Mobility Van Evaluation during the period 28 November 1977 - 3 February 1978. The test evaluated the operational suitability of two commercial storage systems installed in the M129 semitrailer and MILVAN when used for receiving, storing, issuing, and moving small and intermediate-sized Class IX AIM division ASL stocks. Test results showed that neither storage system as configured could satisfy simultaneously the minimum acceptance standards for operational suitability and mobility. The evaluation assessed the operational suitability of using the commercial drawers and bins for the receiving, storing, issuing and moving of Class IX PLL repair parts. The results showed that the commercial drawers and bins were operationally suitable. The QM school completed a Proponent's Evaluation in FY 78; the LOGC indorsed it and sent it on to TRADOC, 19 June 1978.

The Armored Forward Ammunition Resupply Vehicle test was conducted by the US Army Armor and Engineer Board, Fort Knox, KY, during the period 1 October 1977 - 10 March 1978, testing the feasibility of using the M113A1 family of vehicles (e.g., straight M113A1, straight M113A1 with ammo racks provided by Human Engineer Laboratory and a modified M113A1 in which the vehicle was extended in length and modified power plant) in the role of a Forward Ammunition Resupply Vehicle. The experiment included operating with maximum loads, accessibility of ammunition for discharging, vehicle performance characteristics, and crew requirements of each vehicle when loaded. The analysis concluded on 10 March 1978; the LOGC received the final report on 14 July 1978. The Center then conducted a PE receiving assistance from appropriate LOGC directorates and LOGC associated schools. The Center supplied HQ TRADOC with a copy on 13 September 1978.[19]

Test Design and Evaluation

Logistics Supportability (LOG S) Operational Test and Evaluation (OT&E) Methodology. The LOGC LOG S OT&E Methodology final draft was distributed for comment from TRADOC HQ on 1 November 1977. The Center incorporated these comments during the latter part of FY 78-2. The methodology was briefed to the DARCOM Project Manager's Conference in October 1977. That briefing stimulated correspondence between General John R. Guthrie and General Starry which initiated actions to clarify which elements of logistics are to be delivered and tested at each test phase.

Concomitant with this briefing, the LOGC delivered a methodology paper at the 1978 Reliability and Maintainability Symposium in Los Angeles, CA. This symposium and further contacts from people outside the Army community served well to demonstrate the initiative shown by the Army in advancing the state-of-the-art in the logistics testing area.

The methodology served as a basis for a DA level OT&E Logistics Test Methodology. Plans were made to merge it with other efforts which would ultimately yield a more comprehensive approach and which would address a wide range of testing outside TRADOC responsibilities.[20]

Test and Evaluation Milestone Management System (TEMMS)

It became apparent during late FY 77 that the LOGC required a system to track and manage test activities and their status within TRADOC. An automated system was proposed and early development work began. During FY 78, HQ TRADOC approved development of TEMMS. The Center coordinated the effort with the Data Processing Field Office (DPFO) at Fort Leavenworth. The DPFO projected that TEMMS program development would be

completed in FY 79-1 and at that time sample runs with real data and further implementation of TEMMS could proceed.[21]

Manpower Analysis/Force Structuring

A 27 March 1978 memorandum of understanding between MG James H. Merryman, HQ TRADOC and MG James F. Cochran III, HQDA, delineated TRADOC's role in conducting affordability and trade-off analyses in the context of force structuring. To comply with the MOU, HQ TRADOC developed a draft Reg 11-1 entitled, "Manpower Analysis and Force Structuring in the Combat Development Process." On 5 June 1978 the CG, LOGC approved the establishment of a LOGC task force to determine the implications of the regulation and to recommend a LOGC approach to meeting the responsibilities. One of the recommendations of the task force called for the Operations Analysis Directorate to identify which ORSA tools are required to responsively support the LOGC Force Structuring/Manpower Analysis mission. OAD received tasking 7 July 1978 to perform such an analysis with a suspense of 24 November 1978.[22]

Late in August 1978, the Force Structuring Assessment Division evolved out of the Directorate reorganization. The division started its participation in Total Army Analysis - 85 (TAA 85), a process the DA uses to develop its proposed Program Objective Memorandum recommendation for the outyears. Lists of units recommended for addition to or deletion from the force were prepared, submitted to TRADOC, and defended at DA DCSOPS. Simultaneously, the Center wrote LOGC Regulation 11-1, Logistics Force Structuring and Manpower Analysis in the Combat Development Process. This regulation prescribed policies and procedures and assigned responsibilities for force structuring with the LOGC and its associated schools. Logistical Force Structuring Assessments (LFSA) were required in support of the Manpower Analysis Papers (MAP) required by TRADOC Regulation 11-1. The LFSA addressed the effect of new concepts, doctrine and equipment upon the logistical force of the Army. The Force Structure Assessment Division was responsible for LFSA and MAP.

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CHAPTER 5

AUTOMATED SYSTEMS

"Our involvement with automation of logistics management and information systems in concert with DA, the Computer Systems Command, and CACDA," wrote General Smith to General Starry, "continues to increase but with more of a wartime support flavor and priority. We have experienced both success and setback as we maintain, field, and develop these systems. Our major thrusts continue to be to insure a quality product, to thoroughly involve the user, to eliminate punch cards, to develop wartime applications, manage modifications, and to pursue our efforts within the context of an integrated battlefield architecture encompassing communications."[1]

Of the systems currently in the field, the supply systems predominated. During 1978, the LOGC completed fielding the Standard Army Intermediate Level Supply Subsystem (SAILS) Army-wide. SAILS AB has been extended throughout CONUS and in two USAREUR corps, and SAILS ABX has been installed at all other overseas locations and Fort Carson. The conversion to SAILS enabled the Army to retire Base Operating System (BASOPS), Theater Army Support Command (TASCOM-S), and the 3S systems being used in Continental United States, US Army Europe (USAREUR), and the Western Pacific, respectively. A smaller SAILS system known as SAILS A(-), for use at the theater level, was installed at the USAREUR Materiel Management Center (MMC). Because of a resource shortfall on the part of both the LOGC and the Computer Systems Command (CSC), the planned further extension of SAILS ABX slipped. As preparation continued to extend SAILS ABX, it underwent study for application in wartime. The Center also concentrated on reducing the aggregation of functions at the Corps Support Command Materiel Management Center (COSCOM MMC) and data processing unit, thus hopefully reducing SAILS ABX runtime.[2]

SAILS CONUS AB

During this period, the extension of the SAILS CONUS AB subsystem continued with the successful conversion at Fort Polk, US Army Military Academy, and Fort Rucker. Maintenance of SAILS AB continued with System Change Package (SCP) 18 being fielded in November 1977, SCP 19 in August 1978, and SCP 20 in September 1978. The latter package implemented the DOD Materiel Returns Program (MRP) and involved major system changes in virtually all modules. Additionally, SAILS CONUS AB was installed in the Army Commands in Panama and Alaska. The SAILS version applicable to the Corps Support Command--SAILS COSCOM GS--was operational at the two corps in USAREUR, in addition to the COSCOMs at Fort Bragg and Fort Hood.[3]

SAILS ABX

This period also marked the initial operation of SAILS ABX which expanded SAILS AB and provided certain significant features not contained in AB; i.e., capability to process war reserves and project stocks, referral orders, Selected Items Management System-Expanded full range of Military Requisitioning and Issue Procedures (MILSTRIP) codes and interaction with SAILS A(-). The prototype evaluation test (PET) was conducted in December 1976 at Fort Shafter and, concurrently, SAILS ABX became the system of record at US Army Support Command Hawaii (USASCH) and Tripler Army Medical Center. In early 1977, the first SCP for SAILS ABX was fielded, the SCP content related primarily to deficiencies detected during the Systems Integration Test (SIT).

The most significant event during this period for SAILS ABX was the approval from the Office of the Assistant Secretary of the Army to continue extension of the Operation System version of SAILS ABX. As the result of this decision, the entire conversion process was completed for US Army Japan (USARJ) (March 1978), 21st SUPCOM (May 1978), Korea (June 1978), Fort Carson (July 1978), and USAREUR MMC (August 1978). Further extensions depended on a DA extension schedule which should be provided in October 1978.

A major System Change Package for SAILS ABX was developed which included the requirements for the DOD directed Materiel Returns Program. This SCP contained significant functional changes in the SAILS Excess Determination and Excess Disposition Modules.

In the Level B/Storage Operation Module (SOM) area of SAILS ABX, the most significant accomplishment was the completion of extension of the B-Depot Subsystem. This occurred when Kaiserslautern Army Depot was converted to level B/SOM in November 1977. Other accomplishments related to the completion of a study of inventory processes and preparation of necessary System Change Requests to make corrections, and the continuation of the effort to scale down this module for application at CONUS installations.

The remaining SAILS subsystem, the SAILS A(-) theater/command level system, has been inoperative since the disestablishment of US Army Pacific (USARPAC) headquarters. Based on the decision to employ this system in USAREUR, initial work to upgrade SAILS A(-) commenced during this period; this work was necessary because the system had been inoperative for an extended period of time and all applicable regulatory changes which had occurred during that period had to be incorporated in the system. As stated earlier, the SAILS A(-) subsystem interfaced with SAILS ABX and provided theater level managers with asset visibility and control of any item in theater over which they choose to exercise such management.

The SAILS A(-) system was extensively tested in preparation for extension to the USAREUR MMC in November 1978. Additionally, a preconversion follow-up visit was performed to assure all activities were aware of their responsibilities in association with conversion to SAILS A(-) and all milestones were on schedule.[5]

Standard Army Maintenance System (SAMS)

Early in 1978, DA ODCSLOG raised the priority of development of the Standard Army Maintenance System (SAMS). "To this end," observed the LOGC Commander, "we worked with DA to obtain resources and determine wartime processes; an extension in FY 82 is contemplated." Among the most significant actions have been the completion of the Detailed Functional System Requirements (DFSR) and the Organization and Personnel Plan (OPP) documents in November 1978.[6]

As a result of the DFSR review, Automatic Data Processing Equipment affordability became an issue in May 1977 and this, combined with the near team availability ADPE being developed by Army Tactical Data Systems (ARTADS), caused a reexamination of the SAMS concept of automation. The feasibility of using a small device like the ARTADS Battlefield Interoperability Terminal (BIT) at the maintenance company level was evaluated during August 1977. A determination was made that it was feasible, more suitable for tactical situations, and considerably less expensive to field than the dedicated maintenance battalion computer.

Consequently, the Center rewrote the SAMS DFSR, Part I, Maintenance Operations Management (MOM) to reflect this new concept of automation. With a few notable exceptions, current annotated maintenance systems disregarded the needs of the field commander, were cumbersome to operate, and tied the maintenance activity to a central ADPE facility. Recognizing these problems, the Center redesigned SAMS to provide the support maintenance activity (DS/GS) with dedicated ADPE that has the capability of immediate access to on-line interactive work order data base files. This concept of automation provided the maintenance activity with an acceptable degree of autonomy, reduced demands on the communications system, and provided the greatest flexibility in positioning General Support and Direct Support maintenance units in the area of operations.[7]

On 3 April 1978, HQDA tasked the major commands to provide assistance to the LOGC to assist in the SAMS-1 wartime development. As a result of a 24-26 May 1978 SAMS Quarterly In-Process Review, the LOGC, in coordination with CSC, provided HQDA, on 30 June 1978, a revised milestone schedule with primary emphasis on validating near-term dates based on actual and projected resources.

A SAMS General Officer IPR convened on 11 September 1978 and the revised development milestone schedules, submitted to HQDA on 30 June 1978, were the main topic of discussion. The milestones could not be validated during the IPR because HQDA had just received information relative to additional funding for some of the previously unfunded requirements. The majority of the additional funding impacted on USACSC's projections for the Phase II development of the SAMS-1 wartime programs. Therefore, it was agreed that the development milestones should be reevaluated and redeveloped to reflect the new funding information.[8]

Concurrently, the development of the SAMS Organization and Personnel Plan (OPP) continued in FY 78; on 9 November 1977, the Center dispatched tasking letters to each MACOM, directing submission of OPPs. Development of OPPs for TOE units suffered a set back, however, pending a determination of the affect automation of the Equipment Logbook would have on authorization of Equipment Record Clerks in TOE. In January 1978, with the issue resolved, the USAOCC&S, USAMMCS, US Army Signal School, USATSCH, and US Army Engineer School began development of TOE OPP on 6 February 1978 and completed the OPP on 25 August 1978.

In January 1978, the SAMS System Training Management Plan was completed, reviewed by the staff and forwarded to all MACOMs for comment.

On 16 June 1978, HQDA notified the LOGC that HQDA was addressing alternative methods to system/subsystem reporting of materiel readiness; they directed the Center to continue SAMS development without automated Materiel Readiness Reporting (MRR) until readiness reporting and evaluation procedures were stabilized.[9]

Direct Support Unit Standard Supply System (DS4)

As a supply management information system, DS4 automated the supply and stock control functions of the Division Materiel Management Center and nondivisional Direct Support Units for supply classes II, IV, packaged III, and IX. This system was designed to replace the class IX subsystem of Division Logistics System (DLOGS) in the divisions; and the DSU/GSU system in nondivisional DSU.[10]

An August 1976 General Officer meeting decided to combine DLOGS II, which was being developed to replace DLOGS in Army Divisions, with DS4 to produce a single standard supply system for both divisional and nondivisional units. The meeting also agreed that action would be taken during the first quarter of FY 77 to define the single system baseline and to begin the programing effort, without benefit of the approved Detailed Functional System Requirements which were at Department of the Army for approval. The DA Automation finally approved these detailed Functional System requirements on 3 June 1977.

Concurrent with the programming effort, the Center initiated development of functional user manuals, functional training requirements, and test condition requirements. Development of the functional user manuals continued throughout the entire period, keeping pace with the programing effort.

In March 1977, the Center completed the draft DS4 Training Management Plan and distributed it to Army commanders for staffing. Thereupon, they incorporated the resulting comments into the finalized plan which was then forwarded through TRADOC to DA for approval on 4 October 1977.

Test data was provided to CSC for testing individually programed functions as they developed. Functional validation of the completed system was accomplished by formal test condition requirements which continue to be developed. A detailed plan for accomplishing the functional system validation was developed and provided to CSC during September 1977.

To support the extension of DS4, a draft plan evolved which provided guidance necessary for recipient units conversion to DS4. This conversion plan went to the MACOMs for staffing in July 1977.

The LOGC presented an information briefing on DS4 to interested senior officers during August and September 1977. The briefing offered a broad overview of the automated functions of DS4, its applications, advantages, and development status.[11]

Because of programing delays and LOGC/CSC projected resource shortfalls, a General Officer IPR convened 31 March 1978 to consider alternative means of fielding DS4. The various alternatives addressed the standpoint of resource impact and the impact on development/fielding of the nondivisional application of DS4. As a result of the IPR and follow-on meetings, work continued on the development of the division's application with planning directed toward fielding the division application prior to the nondivisional system.[12]

To support the continuing development effort, the LOGC accomplished several important actions. First, it provided USACSC all test data to support Level II (by process). This testing was conducted concurrently with system programing to allow early detection of errors. It also finished a revision of the DS4 OFSR to keep the document current with system development actions. Finally, the Center completed ADP programing at the end of September 1978, and Level II testing on 3 October 1978.

In preparation for Level III (integrated system) testing, which will begin on 2 October 1978, the Center provided CSC final test condition requirements. The Level III test schedule, jointly developed by LOGC and CSC, called for testing to continue until mid-November 1978.

Development of functional user manuals and training documentation generally kept pace with the programing effort. The QMS provided initial draft manuals in August 1978. Functional validation of the manuals was ongoing at the end of FY 78 and continued through FY 79-1. Following completion of the detailed functional training package in early September 1978, Major Command and Army Training Base Cadre received a 2-week block of formal instruction. These cadre assisted the LOGC in revising the training documentation for use at the Field Validation Test site (101st Abn Div) and subsequent extension sites.

The DS4 System Training Management Plan, developed by USALOGC and forwarded to DA for approval on 4 October 1977, was approved in June 1978 and distributed to applicable activities shortly thereafter. Other total system planning documentation remained incomplete or in draft only. The Project Master Plan (PMP), last staffed by USACSC in March 1978, had not been finalized and distributed as of the end of FY 78. Also, USACSC action to develop the Field Validation Test Plan was not initiated until FY 78-4; and thus, the plan was not available at the end of the fiscal year. Lack of these planning documents on a timely basis continued to hinder coordinated planning by all involved commands/activities (figure 1). At the end of FY 78, DS4 was on schedule in accordance with the revised milestones agreed upon at the August 1978 General Officer IPR.[13]

Standard Army Ammunition System (SAAS)

> "Ammunition management presents logisticans with special challenges because of ammunition's criticality, movement and storage requirements, and high procurement costs. Proper management must entail a balance among requirements, storage capacities, and transportation facilities. Timely information must be available to enable logisticians to plan for the continuous supply of the kind and quantity of ammunition required to effectively support tactical and strategic operations or unit training."[14]

Working in conjunction with other Army organizations, the LOGC developed and extended the Standard Army Ammunition System (SAAS). When fully operational, SAAS "will provide the uniform procedures necessary for timely and effective management of ammunition from the theater army materiel management center down through the ammunition supply point."[15]

In addition to supplying user organizations with specially tailored management information, SAAS supported computing requirements; updated stock status; provided serviceability information; prepared allocation status reports; and arranged worldwide ammunition reports. Additionally, SAAS furnished status information to each higher echelon. The Center developed SAAS "to provide a standardized class V management and

	EVENTS	JUN	JUL	AUG	SEP	OCT	NOV	DEC	1978 JAN	FEB	1979 MAR	APR	MAY	JUN
1.	PROGRAMING/LEVEL I TESTING			4										
2.	LEVEL II TESTING(BY PROCESS)				15									
3.	COMPLETE INITIAL DRAFT USER MANUALS/TNG DOC				15									
4.	MACOM/ATB TRAINING				18		10							
5.	LEVEL III TEST (INTEGRATED SYSTEM)					2	10							
6.	PRECONVERSION SURVEY (FVT)						13	17						
7.	COMPLETE FINAL DRAFT USER MANUALS/TNG DOC						13		5					
8.	FVT TRAINING AND CONVERSION								8	2				
9.	FVT									5	2			
10.	FINALIZE, PRINT, DISTRIBUTE USER MANUALS/TNG DOC										5		27	
11.	EXTENSION												30	

Figure 20. DS4 Divisional Milestones

reporting capability from the theater Army level down to the ammunition supply point." This required extreme flexibility. To support this requirement, SAAS incorporated three functional levels.[16]

Level 1 activities "perform centralized theater inventory management, maintain visibility of theater assets, and act as command interfaces with the US Army Materiel Development and Readiness Command." Level 1 also called for an automated training ammunition management information system to operate in conjunction with SAAS. While not currently under development, Level 2 formerly designated a regional or command activity that provided inventory management for a specific area of command. Activities involving Level 3 controlled stock assets of storage sites. SAAS Level 3, the automated munitions management system, was developed for an ammunition stock control activity. The ammunition group or corps materiel management center used this system to control and manage its conventional ammunition to include guided missiles and large rockets. Level 4 activities exercised stock custody and controlled distribution to other storage sites or to the user. SAAS combined automated and manual modes. Levels 1 and 3 are automated, Level 4 is manual.[17]

Operational in the Western Pacific and USAREUR areas since 1973, SAAS Level 1 "provides centralized visibility of the theater's class V assets." The field validation test for SAAS Level 1 System Change Package 11 was conducted at Zweibruecken, Germany, with the 60th Ordnance Group and the 21st Support Comm and ADP Service Center from 10 Through 21 October 1977. SCP 11 was installed at Zweibruecken and Fort Shafter, Hawaii, effective 1 November 1977. SCP 12 was broadcast to Europe on 11 September 1978. Both Fort Shafter and Zweibruecken performed centralized ammunition management functions for their respective theaters. Level 3 and Level 4 systems were developed "to provide class V stock status information for the COSCOM and subordinate elements."[18]

As a consequence, at the beginning of FY 77, the General Functional System Requirements for SAAS Level 3 was being staffed with appropriate commands. An Economic Analysis accompanied the GFSR which showed the costs associated with the development of the system and the benefits which the system would provide to the using units. Because of the complexity of the system and the number of commands which were affected, this staffing process took the entire fiscal year. The Office, Assistant Secretary of the Army (Installations, Logistics, and Financial Management) approved the GFSR on 5 October 1977.

Concurrently with the staffing of GFSR, the LOGC convened a work group to write the Detailed Functional System Requirements. Representatives from six commands assisted the LOGC in writing these requirements. In

December 1976, the Center distributed the initial draft reports and system specifications to Army commands and discussed the resultant comments during a January 1977 In-Process Review. Based on command comments, the Center prepared revisions and translated specifications into detailed documentation suitable for computer design and programming.

As a result of USAREUR's request to the LOGC to develop and extend SAAS Level 3, the Center conducted a functional review of the proposed draft DFSR in February 1978. "We accommodated USAREUR's request," wrote the LOGC Commander, "identifying the wartime essential portions of the system and plan to develop those at an earlier date than would be possible in designing the entire system." Approximately 25 representatives of the USAREUR ammunition community attended the review along with representatives from HQDA, USAMMCS, US Army Logistics Evaluation Agency (USALEA), and the WESTPAC area. This functional review resulted in numerous minor change recommendations to the draft DFSR; it also pointed out the soundness of the overall proposed system. The final draft DFSR for SAAS Level 3 was completed in October 1978 and is presently being staffed with the major commands. Efforts continued toward completion of the Economic Analysis and the Organization and Personnel Plan. These documents were scheduled to accompany the DFSR when it is submitted to USATRADOC/HQDA for approval.[19]

Present and anticipated SAAS users at Level 1 included theater army materiel management centers and major army command materiel management centers. Level 3 users included theater army commands, corps support commands and support brigades. Level 4 users included ammunition supply points.

"The Standard Army Ammunition System will provide logisticians with a tool they need to manage ammunition assets," concluded Stanley Flaming in the Army Logistician. "The key to effective ammunition support will continue to be the ability of logisticians to make decisions. The Standard Army Ammunition System will, however, make those decisions less difficult by providing more timely, complete, and accurate data."[20]

Combat Service Support System (CS3) Supply Subsystem

The original Division Logistics System was designed for use on the UNIVAC 1005 card processor. In CY 74, DLOGS was translated into IBM 360 computer language and became the Combat Service Support System Supply Subsystem. As the UNIVAC 1005 card processor becomes available through the installation of the IBM 360/30 computer in the active Army division, DLOGS is being extended to Reserve and National Guard units. To date during CY 78, the following National Guard units were converted:

UNIT/STATE	SUBSYSTEM	COMPLETION DATE
58th Inf Bde, MD	PB/Class IX	24 Feb 78
155th Arm Bde, MS	Class IX	10 Mar 78
42d Inf Div, NY	Property Book	2 Jun 78
45th Inf Bde, OK	Class IX	11 Aug 78

As of 30 September 1978, the DLOGS Property Book Subsystem served 24 reserve component units, 14 of which operated the DLOGS Class IX (Repair Parts) Subsystem. Only three active Army separate brigades still managed DLOGS on the UNIVAC 1005 card processor.[21]

On 28 July 1978, SCP 03 incorporated the Equipment Readiness code into the system for unit status reporting under AR 220-1. The SCP revised the division roll-up to display assets at battalion level and included due-in data at the requesting unit level.[22]

Combat Service Support System (CS3) Maintenance Reporting and Management (MRM)

In FY 78, the maintenance and operations of CS3 (MRM) continued to receive minimum essential maintenance, due to reduction of resources. Current efforts have been restricted to the development of an automated CS3 (MRM) interface with the Division Logistics System. In August 1977, a General Officers' System Planning Meeting reduced the maintenance and operations of CS3-MRM System to minimum essential maintenance status with only one system change package programmed for FY 78. A reduction in resources decreased these restrictions.

At DA ODCSLOG request, the USALOGC accomplished the proponent agency review of the Level III test for SCP L09-12. The review concluded on 1 December 1977 with favorable results. The 24th Infantry Division, Ft Stewart, GA, successfully validated SCP L09-12 on 20 December 1977, and broadcasted it to all system users on 10 January 1978.

In conjunction with DARCOM, LOGC conducted a review of CS3/MRM. The review determined if the Maintenance Control System module could serve as an interim source of data for the maintenance engineering and weapons system evaluation functions of DARCOM. This review prepared a system change to serve as the vehicle for cost resource impact.

The 82d Airborne Division, Ft Bragg, NC, functionally validated the SCP L09-14 on 20 October 1978. The change package was to be broadcast to system users on 1 January 1979 if a technical deficiency in the executive software can be resolved. A major modification in SCP 14 provided for an interface with the DLOGS.[23]

Department of the Army Standard Port System (DASPS)

Currently in Phase III (Systems Installation, Operation and Maintenance) of the Army Management Information System life cycle, this system served six participating Data Processing Installations: Pusan (Korea), Naha (Okinawa), Yokohama (Japan), Rotterdam (Netherlands), Bremerhaven (Germany), and Fort Eustis (Virginia). With the exception of Pusan (under the 19th Spt Cmd, Taegu), and Fort Eustis (under FORSCOM) with no fixed port, the Military Traffic Management Command controlled the corresponding port operations. DASPS extended standard port operations and Military Standard Transportation and Movement to overseas water terminals. SPS not only interfaced with the movements management system which offered automated support at the theater level and the COSCOM movements control center, but it provided accuracy of information.

During FY 77 and 78, the DASPS continued in an operational and maintenance phase. In November 1976, DA ODCSLOG granted functional user status to the 7th Transportation Group, Ft Eustis, VA, a FORSCOM unit. The 7th Transportation Group exercised the DASPS during the Joint Logistics Over-The-Shore (J-LOTS) main test that was conducted during August 1977. However, during the J-LOTS, it became evident that the 7th Transportation Group required limited processing capability at the beach site. Actions were initiated to identify the 7th Transportation Group's information requirements in order for them to maintain control and manage the movement of cargo in a LOTS environment, while supporting a corps.[24]

Although primarily a technical SCP, System Change Package 04 emerged 1 November 1976. The proponent agency validated SCP 05, a major rewrite of the import process, and sent it to the users in September 1977. A major modification in SCP 05 allowed creation of printer backup (spooled) tape files to be used by the 7th Trans Gp for its Remote Print Facility during the J-LOTS and for other exercises. SCP 05 created the capability to produce Lift Data Cards for entry into the Visibility of Intransit Cargo (VIC) System. These functional changes required substantial technical modifications. Due to the small core storage (16K) of the SPECTRA 70/15, on which DASPS is run, programs were rewritten and repackaged. Functions previously accomplished in one program moved to another program because the coding exceeded the available memory. The Field Validation Test (FVT) of SCP 05 took place in Bremerhaven during 15-30 October 1977. All open SCRs were reviewed and the necessity for a system upgrade identified.

The US Army Computer Systems Command Support Group, (Fort) Lee received functional guidance and Test Condition Requirements (TCR) for SCP 06. The FVT was waived since the SCP consisted mainly of technical System Change Requests. SCP 06 used Pusan as the lead site and subsequently was installed at the four other ports.

Several port operation transfers took place during this period, including Naha on 1 October 1977 (MTMC), Pusan, on 1 September 1978 (19th Spt Cmd), and Yokohama on February 1978 (MTMC). In addition, the DASPS Functional Users Manual, TM 38-116-11 was oriented and distributed to the field during November 1977.[25]

Department of the Army Standard Port System-Enhancement (DASPS-E)

Certain deficiencies underscored the need to develop a replacement system for the current DASPS; i.e., ADPE obsolescence, lack of wartime and backup capability, operational inefficiency, and inability to support contingency requirements of the 7th Transportation Group. Beginning with a functional analysis of all port and port related functions, the system developed using top down, structured technology. DA ODCSLOG directed that priority action be given to upgrading DASPS, and on 18 May 1978, tasked the LOGC with the responsibility of completing upgrade action by the 4th Quarter of FY 78, and on 18 May 1978, it approved it.

DA ODCSLOG staffed the DASPS-E draft upgrade plan with the DASPS community on 24 April 1978. The following month, they approved the upgrade plan and tasked the USALOGC, as chairman of the System Development Group to distribute the upgrade plan with revised milestones. On 22 June 1978, the LOGC complied with that directive.[26]

DA Movements Management System (DAMMS)

During early FY 77, DA reviewed the DAMMS system concept in light of recent doctrinal and organizational changes within the Army. This review revalidated the DAMMS concept, approved the Development and Management Plan that was forwarded in 4th Qtr, FY 76, and published an updated system development tasking letter directing continued system development effort.

The Center designed the DAMMS as an on-line system to support the Theater Army Movements Control Center and geared it to allow the theater/corps/task group commander to select the particular modules to be operated. (The system consists of five modules; Cargo Movements, Mode Movements, Movements Programing, Performance Data, and Passenger Movements.) Using all the modules provides the TA Movements Control Center (MCC) with a comprehensive movements management and analysis capability, as well as short and long range movements planning, asset management, and monitorship of theater transportation system performance.

Developmental efforts during FY 77 concentrated on the Cargo Module and the Movements Programing Module. The LOGC development effort concentrated on the Visibility of Intransit Cargo subsystem of the Cargo Module of DAMMS. Operating under LOGC tasking, the US Army Transportation

School continued developmental work on the GFSR for the Movements Programing Module of DAMMS.

During FY 77, the Department of the Army's Office of the Deputy Chief of Staff for Logistics designated the DAMMS Cargo Module, Mode Management Module, and Movements Programing Module as minimum essential transportation requirements during wartime. However, during FY 78, development work continued only on the Cargo and Movements Programing Modules as a result of funding constraints imposed upon the Army.[27]

Cargo Module. Development on the import cargo phase of the Cargo Module of DAMMS continued in Europe. The Visibility of Intransit Cargo System, which forms the baseline for the Cargo Module, received priority for development resources during FY 77-4 as a result of a general officer system development priorities review. The DAMMS Development Team worked in conjunction with functional personnel from HQ 4th Transportation Brigade and US Army Computer Systems Command Support Group, Europe (USACSC-SGE) in the design, programing, and incremental systems testing of the system. VIC is a pilot Army project using the advanced technology systems design methodology of top down, structured design and programing.

The LOGC DAMMS Development Team provided onsite assistance to HQ 4th Transportation Brigade and USACSC-SGE during the July-August 1977 timeframe and the October-December 1977 timeframe. Assistance consisted of TCR preparation, functional definition of requirements, user's manual development, and review of Incremental Systems Test results. The DAMMS Development Team participated in the DA Standard Port System Systems Change Package 05 Field Validation Testing to validate the DASPS-VIC systems interface and worked in conjunction with elements of HQ Military Airlift Command to correct/validate the system's interface between the MAC ADAM I Aerial Port System and VIC.

DA chaired USAREUR in-process reviews on the VIC development action in July and December 1977. IPR decisions implemented the import cargo phase of the Cargo Module incrementally and established nine major functions of the system for development priority and sequence within current resource constraints.

As directed by the VIC System Integration Test Plan, 20 April 1978, the LOGC and HQ USAREUR served as co-chairman of the Functional Evaluation Group. LOGC provided one person to the Functional User Support Team. The formal SIT transpired at 4th Transportation Brigade, Oberursel, Germany, 11 June to 9 August 1978. The SIT demonstrated that VIC satisfied the defined needs; it evaluated VIC capability to fulfill peacetime and wartime requirements; it verified VIC interfaces with associated systems; it demonstrated communications support; it substantiated VIC software efficiency and adequacy of documentation, and finally,

it proved that outputs are in accordance with specifications. It achieved these objectives by processing VIC at DPI M104. The ADP site was completed 19 May 1978 and ADPE hardware installed on 2 June 1978. Because the site, DPI, equipment, and personnel were relatively new, the lack of experience and the inherent capability associated with an ongoing installation caused some dilemmas throughout the SIT, but the system functioned to the satisfaction of the technical, functional, and communication evaluation groups. The SIT concluded that: (1) test objectives have been satisfied, (2) VIC will perform in a live environment, (3) prime incidents will be resolved by 15 October 1978, (4) communications support was successfully demonstrated, (5) the SIT evaluation was conducted beyond the scope of a normal SIT, and (6) the 4th Transportation Brigade should continue processing VIC in a shake-down mode. It recommended that the shake-down period of VIC correspond with that of PET and that an abbreviated PET evaluation commence on or about 1 November 1978.

Modular AUTODIN Terminal Equipment (MATE) upgraded the Oberursel supporting communications center. This system came equipped with magnetic tape, card, paper tape, and an optical character reader (OCR) for direct entry of narrative messages. The UNIVAC DCT 9000 Automated Multi-Media Exchange terminal upgrade gave way to the MATE, an advanced state-of-the-art system. Initially, the MATE was to be homed directly into AUTODIN. Site prep for this upgrade began with installation to be completed in May 1979.

The DA-chaired IPR on the VIC development action commenced in USAREUR in August 1978. DA tasked LOGC to chair a modified PET for VIC I to be conducted 1-15 November 1978. The PET singled out 180 modules and moved through the 9-step development process. The FDA identified priority of development for the Container Management Application and elevated IDC preparation in priority to discontinue the parallel running of the USAREUR SEAMIST. System SCRs were frozen for SCP 1 on 10 October 1978 and SCP 2 on 10 January 1979. Upon completion of a successful PET, VIC I will become a system of record and will be operationally utilized. Development of VIC I will cease within USAREUR by the end of FY 79 and will be transferred to LOGC/USACSCSGL control at Fort Lee, VA. Both LOGC and USACSCSGL identified required resources to apply against the VIC maintenance/development effort at that time.

The LOGC DAMMS Development Team provided onsite assistance to HQ 4th Transportation Brigade during the June-August timeframe that was in conjunction with the SIT. The team rendered assistance in providing functional/technical advice for updating the EA for VIC Phase I in the following areas: (1) development concept, (2) EA team, organization, (3) EA baseline, (4) VIC cost structure, (5) EA/VIC alternatives, and (6) specific areas of potential savings/benefits. Samples and copies of LOGC EAs supplemented this assistance.

In conjunction with HQ Military Airlift Command, the LOGC DAMMS Development Team interfaced requirements of the new Air Force Consolidated Aerial Port System (CAPS) with VIC. CAPS should be implemented in Germany in FY 80 and will enhance the current ADAM/VIC interface requirements. "We will assume responsibility," General Smith told General Starry, "for the maintenance and continuing design work on the Cargo Movements Module upon its transfer from Europe to the US Army Logistics Center in the 4th quarter of FY 79."[28]

Movements Programing Module. Completion of General Functional Systems Requirements development and submission to HQDA for approval was retargetted for 2d Quarter, FY 79. In 4th Quarter, FY 78, DA ODCSLOG directed that a Functional Description IAW DOD Standard 7935.15 be accomplished vice a GFSR IAW AR 18-1. The milestone schedule remained the same.

Mode Management Module, Performance Module, and Passenger Movement Module. Development work on these major modules of DAMMS failed implementation during FY 78 due to lack of developmental resources attributable to the lack of sufficient priority for development at HQDA.

Battlefield Automation Management Program (BAMP)

At the direction of the Vice Chief of Staff of the Army, LOGC developed the BAMP to obtain effective management and control over the proliferation of battlefield automated systems. (The primary function of Battlefield Automation, corps and below, is to optimize the ability of Army forces to wage war, by improving the ability of the commander and staff to see the battlefield, plan the operation, allocate forces, fight the battle, and sustain the forces and enhance the effectiveness of weapons systems.) As the LOGC focal point for BAMP, the Plans Office, Plans and Management Division, Systems Design Directorate, produced up-to-date information for the TRADOC Information Shortfall List, provided estimated percentages of shortfall satisfaction for USALOGC systems, and assisted USAADMINCEN in development of the personnel burden assessment for USALOGC systems. As required by the BAMP, the Plans Office also coordinated and submitted to USACACDA descriptions for each LOGC Battlefield Automated System (BAS) and a functional system concept for logistics operations.

Related to the BAMP, the Army Battlefield Interface Concept (ABIC), represented a CACDA attempt to define requirements for interoperability among the Army's BAS during the 1980-1985 timeframe. In coordination with CACDA, the Plans Office studied anticipated interfaces involving LOGC systems. Future LOGC involvement with ABIC should increase as the systems interfaces become more defined and the information to be exchanged and the required media of exchange are established.

As an adjunct to the BAMP, the Plans Office initiated action to establish a wartime requirements library for supply, maintenance, and transportation functions. When completed, this library will serve as the baseline for development and evaluation of logistics systems.[29]

Transportation Operational Personnel Property Standard System (TOPS)

The Commander, Military Traffic Management Command, directed the functional DOD worldwide Personal Property Movement and Storage Program. In FY 76, this program cost over $786 million for the movement and storage of personal property alone. These moves made the quality of the program's service a significant factor in the emotional attitudes of military members. Therefore, the program merited great concern for its cost and its effect on military members.

With a few notable exceptions, the Personal Property Program was a predominantly manual system, burdened not only by the traditional problems of manual systems, but additionally by the long-standing complexity of the commercial transportation industry. The existing program instituted after World War II became a nonstandard, nonresponsive, and cumbersome instrument that no longer fulfilled its role.

The existence of several single service developed automated systems testified to the awareness of the services to the problems inherent in the present program. All of the automated systems in use today attempted to relieve particularly pressing areas of difficulty. Unfortunately, because of the lack of standardization and service coordinated impetus, these automated systems became isolated and ineffective in solving the overall problem.

Recognizing the historical problem, the Deputy Assistant Secretary of Defense (Installations and Logistics) issued a Memorandum on 10 November 1978, requesting that the Commander, MTMC convene and chair a "joint working group" to oversee the development of automated systems relating to the Personal Property Program. This group, later renamed the TOPS Steering Committee, organized in May 1976, and began, with service assistance, to investigate the overall problems and possible DOD-wide solutions. The Steering Committee developed a Concept Plan which was approved by a DOD Memorandum on 11 February 1977. This memorandum tasked the Military Services and MTMC to "proceed with those actions which will result in a standard operational management and data system." The Navy became the Executive Agent for the joint service project; and a Joint Development Team (JDT) formed consisting of functional and technical representatives from each service. The JDT developed the data system specifics and the philosophy and design criteria for the joint system.

The LOGC became the Army's development center for TOPS. In May 1976, the Center directed its initial efforts toward support of the Steering Committee. Resource constraints during the period 1 October 1977 through 31 March 1978 continued to impact on the TOPS development effort resulting in minimal LOGC participation in Joint Development Team actions. Transportation Branch analyst personnel completed the TOPS EA and forwarded it to TRADOC for review on 23 January 1978. That Headquarters forwarded the document to DA in March 1978. The EA staffing included the related Functional Description (FD).

On 26 January 1978, DA ODCSLOG required the LOGC to: (1) continue participation in JDT development of standard data elements and a compatible manual system, (2) develop Army functional management information requirements capable of being satisfied by TOPS, (3) monitor and participate in other services' development and testing for the purpose of facilitating ultimate Army implementation, and (4) provide functional assistance and guidance to commands and/or installations.

The taskings inferred that a requirement existed to assess the potential impacts on, and problems related to, the automation of the DOD personal property program by three Services while the Army continued operations in a manual mode. DA ODCSLOG concurred with the USALOGC's position that this constituted a substantial problem, and approved an evaluation effort.

In the summer of 1978, the problems in the Army Personal Property Shipping Offices (PPSO) and the high number of civilian community moves combined to create an extraordinarily difficult season for DOD personal property shipping. The impact of the unusually rough summer shipping period reached to the highest levels of the Army staff. As manifested by poor summer service, the problems of the PPSO brought high level attention to the plight of the Personal Property Program.

In response to a Chief of Staff request, DA ODCSLOG prepared a set of actions which, if taken, could alleviate many of the problems in the program. One action continued development of the TOPS. Shortly before the end of FY 78, DA informed the LOGC that funds had been designated for the FY 79 development effort. The Center spent the final weeks of FY 78 preparing for active system development beginning in early FY 79.[30]

The Army Maintenance Management System (TAMMS)

In early 1978, the Center published a new draft of TM 38-750 and circulated it to all US Army commanders prior to implementation, to provide time for all concerned to become familiar with its contents and requirements. HQDA established 1 July 1978 as the official implementation date.

A Change 1 update for TM 38-750 was also approved, published, and distributed US Army worldwide in late FY 78. HQDA approved the new draft update (Change 2) for the same publication, as well as for TM 38-750-1. Galley proofs were reviewed; 31 October 1978 was the proposed publication date.

TAMMS customer service answered 247 types of correspondence on TM 38-750 and TM 38-750-1, requesting detailed instructions, suggestions, and PS Magazine approval/disapproval for publication. This service included FONECONs, US Army worldwide.[31]

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CHAPTER 6

OPERATIONS ANALYSIS SUPPORT

Despite Department of the Army's reassurance that the Logistics Center's Operations Research and Systems Analysis (ORSA) capability during FY 77 and FY 78 was more than adequate, General Smith lamented the "decided shortfall in that area considering the growing demands for and the increasing sophistication of analytical methods." He told TRADOC that the Center must "considerably expand our analytical base," if it is to meet its future goals and commitments. Evidence of this growing dependence on an ORSA capability was found in the Center's role in completed and programed major Operations Analysis support efforts conducted during this 2-year period.[1]

Cost-Benefit Analyses

"The conduct of economic analyses and burden assessments in support of the development of US Army standard logistics systems, " wrote General Smith to General Starry in February 1979, "is a continuing major mission requirement." During this 2-year period, FY 77 and FY 78, the center completed an assortment of burden assessments and a quick response cost analysis. The Center also undertook an additional four economic analyses and one special burden assessment project. Seven economic analyses, seven burden assessments, and three special projects were scheduled for completion during CY 79. Six additional economic analyses were scheduled to begin. General Smith did however point out to the TRADOC Commander that because of personnel shortfalls during this period and the prospect of continued personnel problems, these analyses suffered accordingly. He hoped that, "continued growth in regulatory and special DA requirements for economic analyses in the foreseeable future would appear to justify additional authorizations through your headquarters."[2]

Economic Analysis for the Standard Army Intermediate Level Supply Subsystem, Level ABX. An economic analysis for the Standard Army Intermediate Level Supply Subsystem, Level ABX for the Prototype Evaluation Test milestone was prepared onsite during the PET at the US Army Support Command, Hawaii, Fort Shafter and submitted in February 1977. In May 1977, DA DCSLOG (DALO-PLS) requested a revised Economic Analysis to meet comments provided by the Army Audit Agency based on their review of the PET EA. On 10 June 1977, before the PET EA could be revised, DA DCSLOG asked for a special EA comparing two mixes of SAILS AB and ABX with SAILS ABX worldwide. The special analysis was submitted on 23 September 1977. On 12 January 1978, the LOGC delivered another EA to DA DCSLOG to assist in a decision to extend SAILS ABX to sites wherein the computer operated on operating system executive software.

The Center completed the revised economic analysis for SAILS ABX at the Prototype Evaluation Test milestone and submitted it to DA ODCSLOG in February 1978, as scheduled. The analysis indicated that SAILS ABX extended throughout the Army was the most cost effective alternative.[3]

Economic Analysis for the Standard Army Maintenance System (SAMS) Detailed Functional System Requirement (DFSR), Part 1. An economic analysis (EA) to accompany the Standard Army Maintenance System (SAMS) Part 1 DFSR passed through TRADOC to DA DCSLOG on 7 February 1977. The US Army Logistics Evaluation Agency, DA DCSLOG's executive agent for SAMS, announced on 31 March 1977 the formation of a task force to prepare an EA to consolidate the retail, wholesale and HQDA levels of SAMS for submission with the DFSR in September 1977. On 26 September 1977, DA DCSLOG informed LOGC that requirements for a consolidated EA were rescinded and that they should prepare an EA for the DFSR SAMS Parts 1 and 2 separately with a target completion date of early FY 79 for Part 1.

Planning for the conduct of the economic analysis for SAMS Part 1 DFSR ended in May 1978 and letters tasking the MACOMS for EA input were transmitted by 11 July 1978. During the period 15-19 May, the EA team visited Fort Hood to validate and collect benefits data at the corps, each division, and the TDA maintenance activity. The Center analyzed these data and developed a set of benefits. Additional EA guidance was requested during a SAMS status review on 23-26 May 1978. A General Officer In-Process Review, 8 September 1978, decided that the DLDED ROC would support SAMS hardware requirements. At the close of the fiscal year, a revised suspense for the EA was set at 1 February 1979.[4]

On 24 February 1978, Operations Analysis Directorate presented a cost analysis for 4 SAMS alternatives at a General Officer In-Process Review.

Economic Analysis for the Standard Army Property Book System (SPBS). On 20 September 1976, DA DCSLOG (DALO-PLS) tasked the LOGC to prepare an economic analysis for SPBS at the Prototype Evaluation Test milestone, Fort Carson, CO, from 25 July 1977 through 5 August 1977. On 26 September 1977, DA DCSLOG deferred all action on SPBS and rescinded the requirement for the EA.[5]

Economic Analysis for the Standard Army Ammunition System Level 3 (SAAS Level 3). The LOGC submitted the economic analysis to accompany the SAAS Level 3 GFSR for staffing on 12 November 1976. Based on the comments developed during the staffing, the Center put forward a revised EA on 11

February 1977. A further revision was discussed due to comments provided by the Army Audit Agency in August 1977. However, DA DCSLOG requested approval of the GFSR and EA with the provision that the EA for the DFSR would correct the problems that occasioned the AAA comments.

The Center completed planning for the DFSR economic analysis during FY 78 and initiated gathering data. The Central Ammunition Management Office, Pacific, US Eighth Army, and US Army Japan received visits during the period 27 November - 18 December 1977, and the relevant elements in US Army Europe during the period 12-28 February 1978. During these visits, the LOGC either collected or arranged to collect data on current system operations and potential benefits of SAAS Level 3. The LOGC transmitted tasking letters for baseline system costs to all relevant Army elements by August 1978. Because of realignment of priorities, suspense for completion of the subject economic analysis changed from 1 December 1978 to 15 January 1979.[6]

Economic Analysis for the Direct Support Unit Standard Supply System (DS4). OAD submitted the economic analysis to accompany the DS4 GFSR on 27 August 1976. A General Officer In-Process Review of DS4 convened during the period 16-17 February 1977. A decision enamating from the IPR merged development of both the nondivisional application and the divisional application and treated the combined development as DS4. The divisional application had previously been identified as System Change Request L11-R038 to the Division Logistics System; and an EA for that SCR had been submitted in November 1975 and approved in January 1976. On 28 July 1977, DA DCSLOG tasked the LOGC to prepare an EA for the divisional application with a suspense of one year after the Field Validation Test. Subsequently at a DS4 status review meeting during the period 28-29 September 1977, the Center decided to review the EA guidance for both the divisional and nondivisional applications of DS4.

This economic analysis supported the Field Validation Test for the Divisional Application of DS4. During FY 78, a computer program ended which evaluated the automated interchangeability and substitutability module of DS4 as part of the benefits analysis. The program identified and coordinated additional benefits with the design team. On 16 March 1978, LOGC appraised the size of the Asset Balance File required for the divisional application, prepared a computer program and requested demand history tapes from several divisions in CONUS and USAREUR. December 1978 was set as the completion date.

During the period 14-19 May 1978, LOGC representatives visited the 1st Cavalry and 2d Armored Divisions at Fort Hood, TX, to validate the list of potential benefits associated with the implementation of the Divisional DS4. As a result, this Center refined the list of potential benefits and determined the methods of measuring the benefits. Development of computer programs to evaluate the benefits of the interchangeability and substitutability module through simulation continued.[7]

Cost and Operational Effectiveness Analysis (COEA) for the Division Level Data Entry Device (DLDED). During a Joint Working Group Meeting held at the USALOGC during 5-6 October 1977, it was decided to prepare a Required Operational Capability document for DLDED rather than a Letter Requirement. The original tasking to OAD requested a mini-COEA and LOGC negotiated with HQ TRADOC to conduct an economic analysis as the mini-COEA. The original target date of 15 May 1978 slipped to mid-August 1978. Planning for the conduct of the EA and some data collection were accomplished during this period. On 28 March 1978, USALOGC received a message transferring responsibility for the DLDED development to the US Army Signal School and Center.

Despite this transfer, LOGC learned in early June 1978 that it was still responsible for the economic analysis. The Center organized a task force to attempt to meet a 15 August suspense and held an orientation and tasking meeting on 27-28 June 1978 with representatives from the US Army Administration Center; Military Personnel Center, DCSPER; US Army Computer Systems Command; Project Manager, Tactical Management Information Systems; US Army Signal Center; and the LOGC. Written tasking went out on 6 July 1978 and LOGC initiated data gathering for its portion of the tasking. The 15 August suspense proved to be unrealistic, and HQ TRADOC approved a new suspense of 15 October 1978. The ROC was rescinded on 30 August 1978 and rewritten and a new suspense of 20 November established. LOGC continued gathering data, clarifying tasking, and designing the tabular presentation at the close of the fiscal year.[8]

Automatic Test Support Systems (ATSS) Cost and Operational Effectiveness Analysis (COEA). On 15 December 1976, TRADOC directed the LOGC to conduct a COEA in support of a Required Operational Capability for ATSS. The tasking message established 15 August 1977 for submission of the COEA and 1 October 1977 for TRADOC submission of the package to DA. A combined TRADOC-LOGC team visited the Product Manager of ATSS at Fort Monmouth on 18-19 April to negotiate a constrained COEA and to set milestones for DARCOM and TRADOC. Agreement was reached during this visit and the approach was briefed to the DA staff on 20 April.

Three coordination meetings were held involving DARCOM, TRADOC, LOGC, and the PM-ATSS through the summer to arrange for transmittal of the ROC to DA without a COEA and to resolve the information/data acquisition problem for conduct of the analysis as expeditiously as possible. Concurrently, coordination was also intensified betweeen the LOGC COEA team and the two major DARCOM elements involved: the PM-ATSS and MIRADCOM.

In October 1977, DARCOM hosted a meeting to discuss an interim purchase of Automatic Test Equipment (ATE) and the processing of a ROC

document without a COEA. The meeting cited lack of requisite input information as the reason a COEA could not be provided. At a subsequent meeting on 27 October, DARCOM arranged for its electronic and missile organizations to furnish some of the required input information with contractual support. At the close of the reporting period, progress made through those arrangements confined itself primarily to the definition of candidate ATSS configurations bearing on the COEA alternatives.

An OT I of the AN/USN 410 occurred in Germany in February 1978. LOGC personnel monitored the test, brought back data, and implemented a supplementary data gathering plan to capture data required but not specified in the test plan.

LOGC sent an updated study plan to TRADOC on 13 March, superseding the June 1977 plan. Due to the unavailability of required input information and virtual suspension of the COEA activity shortly thereafter, TRADOC did not act on the plan. The following month, TRADOC and LOGC representatives met to suggest changes to the ATSS COEA study plan which was subsequently revised and forwarded to TRADOC on 26 April. TRADOC withheld approval subject to the establishment of a study advisory group review.

TRADOC convened the first SAG meeting on 15 June. LOGC representatives joined agents from DARCOM, TRADOC, MIRADCOM, and other interested commands and agencies to review the study assumptions, limitations, and the baseline and alternatives cases of STE configurations. Lacking a consensus, the SAG chairman designated the LOGC and the PM ATSS responsible to collectively reexamine the baseline and alternative cases, the essential elements of analysis, the measures of effectiveness, and the appropriateness of the existing sample of ATE user systems for the study.

At an 11 July meeting, the PM ATSS representative agreed to configure and cost the hardware involved in a revised baseline and set of alternatives. This information, with the revised MOE and EEA, went to all SAG members on 4 August 1978.

Comments from the SAG members indicated some confusion about the precise meaning and intentions of the alternatives. To clarify the issues, a meeting transpired on 28 September 1978 with TRADOC and LOGC representatives; TRADOC agreed to issue a study directive by October 1978.

In his annual report to TRADOC, the LOGC commander lamented this situation and noted that it was a cause of "considerable frustration." "The fundamental problem," he wrote, "has been the lack of DARCOM inputs to the Concept Formulation Package and no commitments that the information will be provided."[9]

Armored Combat Logistics Support Vehicle Family (ACLSVF) (COEA). LOGC analysts worked closely with TRADOC and TARADCOM counterparts on the feasibility of including the General Support Rocket System vehicle chassis in the Armored Combat Logistics Support Vehicle Family "This center," wrote General Smith, "performed a Red Team scrub of the original TARADCOM study, proposing improvements particularly on scenario and vulnerability aspects. The suggested changes resulted in an improved analysis with sufficient credibility to recommend that the GSRS vehicle chassis be included as an alternative in the ACLSVF COEA." LOGC and TRASANA worked together to meet an August 1979 suspense date. Coordination within TRADOC became complicated, however, since the COEA included the Field Artillery Ammunition Support Vehicle with the three vehicles originally constituting the ACLSVF (the Armored Forward Area Rearm Vehicle, the Maintenance Assistance Vehicle, and the Medical Evacuation Vehicle).[10]

Burden Assessments. Under tasking from the Battlefield Automation Division (BAMD), Combined Arms Center, OAD accomplished the cost portion of the Burden Assessments for the Standard Army Intermediate Level Supply Subsystem Level ABX and the Decentralized Automated Service Support System. They were submitted through the Systems Design Directorate on 22 May 1978.[11]

Modeling and Simulation Capabilities

During this period, the LOGC refined and promoted modeling and simulation techniques within the Center and at the schools and associated centers, but remained, in the words of General Smith, "considerably short of where we should be." With the TRADOC Master Plan for Models and Supporting Data Bases as a guide, the Center crafted a number of new simulation models which, observed Smith, "represent logistics support realistically and are major elements in new and more objective methodologies to speed up and enhance the validity and credibility of our programs and studies."[12]

Restructured General Support (RGS). In its support of RGS, the Center compared the effectiveness of the RGS maintenance concept with existing TASTA-70 maintenance doctrine using computer simulation. The Maintenance Support Concepts Model was chosen "because of its capability to simulate the maintenance functions of an entire corps. The application of this model was a large-scale LOGC effort that successfully combined military expertise and OR techniques. Military analysts provided a myriad of input data and decision rules for running the model using the TRADOC European Scenario. The results," concluded the LOGC Commander, "displayed the quantitative differences between the two maintenance systems in terms of system productivity and available combat vehicles on the battlefield."[13]

LOGATAK I and II. During FY 78, the LOGC adopted the LOGATAK I simulation model in order to test logistics distribution systems (supplies and materiel) and to evaluate interdictions impact on lines of communication and supply points. The requests supported the "V Corps Now" effort and an analysis of the SCORES Theater Level Scenario. LOGATAK II studied the impact of interdicting supply columns. The Center began applying it to the MMCS Munitions System Support Structure-Extended (MS3-X) study. The Center acquired both models as an offshoot of the Joint TRADOC/DNA labors in the TNF/S program.[14]

Retail Stockage Policy Evaluation (RSPE) Phase I. This effort developed a capability and procedure for making comparative evaluations of Class IX retail stockage policies. The Study Sponsor, DA DCSLOG, received a draft study plan on 19 August 1977. DA approved the general approach and target dates for FY 79. During September, work began on MAWLOGS Model design and data requirements for stockage policies defined in AR 710-2, Materiel Management for Using Units, Support Units, and Installations.

A multipart effort involving the evaluation of Class IX (repair parts) stockage policies, Part I, Phase I developed computer simulation models representing the three retail stockage policies (Days of Supply), Economic Order Quantity (EOP), and Economic Inventory Policy (EIP)), specified in AR 710-2. Models of the US Army Worldwide Logistics System (MAWLOGS) were the basis of model development; they have an automated simulation capability which aids in the development of "tailor-made" models. Subsequent parts of Phase I used these and other MAWLOGS models for the evaluation of existing and proposed policies.

The LOGC conducted an In-Process Review with DA DCSLOG on 16 January 1978. Of the three Phase I, Part I, models to be developed, DOS and EOQ have been completed. The EIP has been developed, but due to initiation of an intensive training program in simulation concepts and techniques, a 4-month slippage occurred. Formal classroom training began 28 March 1978 under the auspicies of the BDM Corporation.

Staffing of the draft study report began in August. Results of this effort demonstrated that the MAWLOGS-developed models were properly sensitive to variations in stockage parameters and that such models can be used successfully in future comparative evaluations of stockage policies.[15]

Retail Stockage Policy (Class III Supply). This contractually supported effort developed, tested, and evaluated a pilot simulation model to provide the Army with an in-house capability of performing objective evaluations of bulk supply distribution and stockage policies.

The pilot model was intended for a bulk POL fuel distribution system from the port (tanker scheduling and discharge) through high pressure pipeline systems (with barge and rail alternates) forward to terminals where final distribution is by truck or hoseline.

This simulation effort not only provided pilot model(s) for making comparative analysis of alternative bulk petroleum retail distribution systems, but it also trained LOGC analysts in the use of an enhanced MAWLOGS modeling system.

The pilot model, designated PETRONET, provided the Army with a prototype model of the US high pressure POL fuel pipeline systems in Western Europe, with portions of the NATO Central European Pipeline System. The model examined and quantified the vulnerability/survivability of the system and the responsiveness (POL throughput) of the system under attack and the efficiency of alternative damage control policies and procedures.

During the reporting period, two Study Advisory Group meetings occurred, with representatives from HQ TRADOC ODCSCD (Analysis and CSS Directorates), the QM Center and School (Combat Developments Reactor and Petroleum and Field Services Department), and the LOGC (Concepts and Doctrine, Materiel, and Operations Analysis Directorates). On 24 May 1978, the second SAG meeting approved for distribution the USAREUR Bulk POL Distribution System Model Design and Data Base. The third SAG meeting, held 30 August 1978, presented sample results from the PETRONET model to the SAG members. The formal OAD classroom training provided under two contracts was about 90 percent complete. PETRONET model documentation will be available to potential users during FY 79.[16]

RAM Modeling Techniques. According to AR 702-3 and TRADOC Regulation 11-8, RAM must be included in a COEA. General agreement existed within the DA community that, at the present time, RAM can't adequately be incorporated into COEAs. To address this problem and to examine current RAM modeling techniques, the LOGC conducted RAM modeling conferences on 16-17 June and 18-19 July 1978.

During the second half of FY 78, LOGC studied several models for incorporating RAM in the COEA process. The Center surveyed 10 models and reached several conclusions. First, the Combat Vehicle RAM Simulation is a good model to use for combat and ground support vehicles. Secondly, the Aircraft Reliability and Maintainability Simulation is much too complex to use for any applications except for large projects. Thirdly, the Logistics Cost Analysis Model can be used effectively for electronics; and finally, the Maintenance Support Concepts model has limited potential because of the considerable effort required for input-data

preparation and large computer core demands to exercise the program. Voids that were identified during the survey were: (1) a medium-sized aircraft model, (2) air defense models, and (3) nonlinear optimization and Lanchester-type models.[17]

Methodology for Correlating Combat Effectiveness with Logistics Support (CELOGS Methodology). On 31 October 1975, MG Graham, the LOGC Commander, directed the CELOGS study team to develop mid-level resolution logistic models for use in relating logistics and combat variables. The team selected operational availability of end items, firing rates, mobility, and weapon density for combat variables and supply of ammunition and bulk POL, maintenance, and transportation for the logistics functions.

Development of a Maintenance Support Concept model and a transportation model were completed during FY 77. As developed by the BDM Corporation, MASC simulated the maintenance system of a corps-sized force for 12 types of end items. In addition to the operational availability of the end items for a given scenario, the model also provided turnaround times by each item for functions of the maintenance system. The CELOGS study extended and validated the MASC.

The CELOGS transportation model, the Aerial Port Clearance model was developed by LOGC analysts during FY 77. Designed for the 4th Transportation Brigade in USAREUR, this model provided allocation rules and input data for the model. The Aerial Port Clearance Model furnished the 4th Transportation Brigade, USAREUR, with an analytical tool for evaluating cargo movement from APODs to consignees with Army truck transport. Model inputs included proportion of throughput pallets, route structures, loading and unloading times, cargo quantity, and vehicle mix. Outputs included vehicle utilization, time required to deliver cargo, distance traveled, and number of vehicles remaining on delivery route overnight. A USALOGC report entitled, "Aerial Port Clearance Model Application," February 1978, was transmitted to USAREUR, 27 March 1978, with computer printouts. Other information on the model had been supplied previously. The transmittal concluded USALOGC assistance to the 4th Transportation Brigade, requested in October 1976, regarding the USAREUR project "Theater Realignment of Line-Haul Highway Transportation". The Aerial Port Clearance and MASC models, along with the previously completed ammunition and POL models, constituted the final set of CELOGS operational models.

During the first six months of FY 78, the CELOGS study addressed the final tasks. The study coordinated with USACACDA on the task of interfacing combat and logistics models, and further, it developed integrated combat and logistics force evaluation procedures. As these tasks progressed, two high priority studies within TRADOC, the Division Restructuring Evaluation and the Model Improvement Program, emerged as more appropriate vehicles for accomplishing integrated combat-logistics modeling. Accordingly, the CELOGS Methodology Study terminated, effective 31 March 1978.

A draft summary report, with descriptions and illustrative applications of models developed or modified during the study, was submitted to HQ, TRADOC. The models described in the report are: (1) a bulk POL model, (2) an ammunition resupply model, (3) the Maintenance Support Concepts model, and (4) the Aerial Port Clearance Model.[18]

Computer Operations

The USALOGC finished both fiscal years with the same dependence on outside computer support. The IBM 7094/1401 computer configuration which became operational at the LOGC in May 1975 continued to provide some needed in-house data processing support. However, the memory limitations of this older scientifically oriented machine resulted in its continuing use for relatively small local business type applications and one-time computer jobs.

The computers at the TRADOC Data Processing Field Office, Fort Leavenworth still supported the major ADP projects of a scientific and data base nature via a remote terminal hook-up from the LOGC. The ADP support of the National Logistics Training Exercise continued to be supported by the UNIVAC computer at the ALMC. The Fort Lee post computer and the CSC-SGL computers, both of which were IBM 360 series machines supplied, on a time available basis, other incidental ADPE support. Thus, computer support for the LOGC continued to be fragmented by the end of FY 78.

During this same period, the LOGC committed itself to a course of action with the Computer Systems Command which retired the LOGC IBM 7094/1401 configuration and gave-up the computer site to CSC Support Group. In return, CSC provided ADPE support for the Center's unique business-type applications; e.g., Logistics Center Management Information System. The LOGC continued to obtain the bulk of its modeling, simulation, and data base support from the TRADOC DPFO. For LOGEX, the Center depended on the ALMC SPECTRA 70/45 computer; however, beginning with 1980, and running through 1985, CSC agreed to provide LOGEX ADPE support.

Despite these arrangements, the LOGC Commander expressed his concern with these temporary arrangements. Writing to General Starry at the close of CY 78, General Smith felt that given the expanding role of the Center, "we must obtain some organic ADPE capability in the mid to long-range timeframe to be effective and responsive in pursuit of our mission requirements which require computer assistance." In August, he requested that TRADOC support and fund a contractual study which would address the totality of the Center's long-range ADPE needs. TRADOC agreed and set March-April 1979 for the study.

The LOGC saw the support provided by CSC as an interim measure only. "Current evidence indicates the planned upgrade of DPFO computers

will not satisfy all of our future data base and analytical needs which will require a high volume of distributed processing and rapid response.," Smith wrote Starry. "These requirements cannot be totally satisfied via remote terminal batch processing."[19]

Logistics Planning Factors Data Base

Maintenance Task Demand File: Phase II. The Maintenance Task Demand (MTD) file, a computerized data base designed and developed at the LOGC, provided a rapid and efficient means of storing and retrieving maintenance related data on Army equipment. Data stored in the data base drove simulation models of the Army logistics system. In turn, these models offered critical analyses in many LOGC studies involving logistics concepts, doctrine, and organizations.

During FY 77, formal data base system development began with the award of a 1-year contract for technical support to BDM Service Company. Contract tasks addressed user requirements, system design, data base structure, and software development. Performance of these tasks continued on schedule throughout FY 77 and FY 78.

Software development and user documentation of the MTD data base ended in November 1977. The data base containing detailed maintenance information for five items of equipment was constructed from government furnished sources and became operational in January 1978. Comprehensive testing of both the MTD system software and data base successfully concluded in February 1978, and the contract officially terminated 28 February 1978.

The primary in-house task consisted in the collection of the required data to be entered in the data base for the first five items of equipment: the M60A1 tank, the M109A1 howitzer, the M113A1 personnel carrier, the M35A2 2 1/2-ton cargo truck, and the M813 5-ton cargo truck. Data on the five items came from three recent Training and Doctrine Command efforts (the Maintenance Standards Study, the Impact of ALOC on Theater Stockage project, and the Wartime Repair Parts Consumption Planning Guide project) and were provided to the contractor for entry into the data base.

Meanwhile, delays associated with the in-house review and refinement of the data from government sources caused slippage in the overall Phase II schedule. In October 1978, the Center drafted a plan for reviewing and refining the data required for MTD and tasked the US Army Ordnance and Chemical Center and School with accomplishing the plan. However, limited resources and higher priority actions prevented the School from initiating the plan with the result that the quality and quantity of data resident in the data base does not completely satisfy the Phase II study objectives. Therefore, the LOGC extended the in-house schedule

for Phase II to FY 79-2 to allow sufficient time to review and refine the data as well as update the data base.

The reorganization of the Operations Analysis Directorate in February 1978, also impacted on the MTD study. In recognition of MTDs potential contribution to the management and development of planning factors for maintenance and repair parts, responsibility for the MTD study shifted from Simulations Division to the Planning Factors Management Division. While this has not affected the current Phase II effort, the MTD Study Advisory Group recommended, with USALOGC Command Group concurrence, that the scope of the Phase III effort be expanded to address these requirements. Thus, expected applications of the MTD file grew from supporting USALOGC analysis associated with the exercise of logistics models and simulations, to supporting the development and management of planning factors for Army-wide use.[20]

Logistics Data Base. During FY 77, the Logistics Data Base (LDB) experienced a consistently high utilization rate due to the heavy demand for data from various combat development users throughout the TRADOC and the Army Logistics community. The LDB provided authorized military analysts raw logistics information by accessing a large scale computerized data base. Some important areas of LDB concern included the Planning Factors Management Office, Joint Strategic Capabilities Plan analysis, and various Scenario Oriented Recurring Evaluation Systems studies.

The Logistics Data Base performed analyses for scores of users, including the 13th Corps Support Command, the Engineer School, BDM Corporation, the 9th Infantry Division, the 1st COSCOM, the Transportation School, the Signal School, the Command and General Staff College, the Ordnance Center and School, the Academy of Health Sciences, TRADOC headquarters, and various elements within the LOGC.

Over 2,600 LDB computer runs were generated during FY 77 honoring valid user requests for data. The system printed eight million lines of output from the system which equates to over 45 miles of computer output.

The system underwent significant improvement during FY 77, including reprograming it to take advantage of the capabilities of the third generation computer at the TRADOC data processing facility. This effort concluded under GSA contract at Huntsville, Alabama. In addition, the system added a file updating capability that will prove invaluable in the improvement of POL and ammunition resupply requirements calculation.

Utilizing this new capability, ammunition rates from FM 101-10-1 and the Department of the Army messages were added to the file. This enhanced file represents a significant improvement from the old file that contained

only the SB 38-26 ammunition rates.[21] The SCORES evaluators and PFMO analysts exploited this new file.

Joint Strategic Capability Plan (JSCP) Annual Cycle Input. A tasking message initiated by DA DCSLOG, DALO-PLF, on 3 November 1976, required the Planning Factors Management Officer to develop unit supply consumption rates to be incorporated into the annual JSCP. A JCS document, SM 774-76, dated 16 September 1976, provided detailed guidance for fulfilling this requirement. Consumption rates were to be developed for each subclass of supply classes III, V, VII, and IX and for all battalion and separate company level Army organizations and each subclass rate would vary according to five intensity situations. The total JSCP effort required the development of approximately 216,000 planning factors.

The task's magnitude dictated that the PFMO complete a portion of the total requirement and expand their efforts with each annual cycle. Eighty-nine divisional battalions and separate companies were selected for the initial FY 78 JSCP input. Between 8-22 November 1976, the PFMO developed a total of 7,000 planning factors for these 89 units. The development procedure itself was a very detailed process organized by supply class in which the developer coordinated with a multitude of information sources. He applied both doctrine and judgment to arrive at a consumption rate or planning factor acceptable to various using organizations.

The input to the FY 78 cycle JSCP was designed to be included in the Logistics Factors File of the Movements Requirements Generator of JSCP. The MRG of JSCP computes the transportation requirements for various contingency plans. Thus, PFMO input to the JSCP resulted in larger TRADOC community interaction with JSC contingency plans. Due to its magnitude and the ability to apply JSCP developed planning factors to a variety of other projects, the JSCP task became the major function of the PFMO.

PFMO input to the JSCP FY 79 Cycle consisted of development of planning factors for 320 units--a total of over 33,000 separate factors. In addition, theater planning factors for supply classes I, II, IV, VI, and III packaged were provided. The developed factors were also applied to various TRADOC projects such as the V Corps CSS Evaluation.

The importance of JSCP planning factors as a basis for DA force structuring became apparent during the latest DA effort in updating the Army Force Planning Data and Assumption (AFPDA) document. Members of the Planning Factors Management Division were tasked to update their JSCP effort to provide DA with the latest factors.

The future of JSCP appeared limitless. Much greater refinement of development procedures was needed as well as more sophisticated ADP supporting

equipment. The development of realistic consumption planning factors served as a basis for subsequent force structuring; thus, the requirement for more accurate planning factors always existed. The PFMD worked on input to the JSCP FY 80 Cycle.[22]

Manpower Authorization Criteria (MACRIT)

The US Army developed the Manpower Authorization Criteria system some 15 years ago to provide a basis for determining and justifying personnel authorizations. Since its inception, this system has had major shortcomings identified indicating that the MACRIT system does not provide accurate and traceable results. To address this problem, the Commander of the US Army Logistics Center requested that the US Army Materiel Systems Analysis Activity (AMSAA) conduct an investigation of both the process for generation of Direct Annual Maintenance Man-hours requirements and the application of the Indirect Productive Time Factors. This study, completed in July 1976, identified a multiplicity of problems in the overall process and recommended several revisions and improvements to the system.[23]

On 15 July 1977, the LOGC briefed the Chief of Staff, Army on the OMNIBUS and Total Logistics Readiness/Sustainability (TLR/S) systems, including the problems associated with MACRIT data. The CSA approved the ODCSLOG recommendation to validate MACRIT data for logistics units. On 28 July 1977, a meeting of HQ DA, DARCOM, and TRADOC personnel addressed the automotive maintenance MACRIT problem and concluded that a review of the basic development process was essential. On 12 August 1977, DA DCSPER established a Department of the Army General Officer MACRIT Steering Committee and a DA MACRIT Working Group, chaired by the ODCSLOG, to assess the basic development process utilized for MACRIT. The Commander, USALOGC represented the TRADOC GO on the DA GO MACRIT Steering Committee.[24]

Subsequently, HQ DARCOM tasked AMSAA to develop an improved MACRIT process for maintenance functions. This task terminated in March 1978 and became the basis for designing a proposed concept for determining valid MACRIT data and a new process for developing Table(s) of Organization and Equipment. In addition, the concept specified that a set of models could be used to provide a theater tailored TOE for a given scenario. The LOGC provided certain changes to the AMSAA concept which established a Central Processing Activity at the LOGC and a counterpart at DARCOM's Materiel Readiness Support Activity (MRSA) located at Lexington-Bluegrass, Kentucky.[25]

Upon submission of the AMSAA proposal, the DA MACRIT Working Group evaluated the proposal and provided funding estimates (personnel, TDY dollars, and contract amounts) necessary to implement this proposal, as

written. Additionally, in April 1978, the LOGC investigated substitute methods that might be employed in lieu of or in conjunction with the AMSAA proposal. Thereafter, a series of meetings ensued attended by the LOGC, associated schools, and the other integrating centers. As a result of the meeting, the group developed a substitute proposal.

The DA MACRIT Working Group convened on 27-29 June 1978, to analyze the two proposals. Additionally, the United States Air Force presented a briefing that outlined their method of determining aircraft maintenance manpower requirements. The chairman of the MACRIT Working Group consolidated the three methodologies into a composite concept which established a DARCOM and TRADOC (LOGC) central processing activity. The group approved the LOGC's approach and "it is generally agreed," General Smith told General Starry, "that this concept will significantly improve the current MACRIT development procedures."[26]

In August 1978, the Chairman of the DA GO MACRIT Steering Committee was briefed on the proposed concept and disclosed concern over implementing a proposal without first attempting a pilot project. To discuss this, as well as a methodology for proceeding with the proposed concept, the DA MACRIT Working Group met on 14-15 September 1978 at Fort Eustis, VA. As a result of the meeting, the Working Group agreed to and jointly signed a "Memorandum of Understanding" entitled, "How Can We Proceed with Pilot Implementation of a System for Improved Manpower Requirements Determination?" During the meeting the Group agreed that the LOGC, upon approval of the directive, would develop both the Project Directive and Project Plan (Pilot Project on the M60A1 Tank). The Project Directive was the first of a series of actions that will eventually evolve into a new process in the Manpower Standards, TOE and Force Development process. The LOGC awaited formal approval by DA DCSPER relative to the Project Directive and tasking to develop the Project Plan.[27]

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27. Smith-Starry, pp. 14, 18. See also Memo, To: D, OPS/ADMIN, 3 August 1978; subj: Trip Report, MACRIT Restructuring - Briefing to MG Long; Ltr, Smith to MG Sheffey, 10 August 1978, subj: MACRIT; Trip Report, ATCL-ORR, 21 September 1978, subj: MACRIT Working Group; 25 September 1978, SAB.

CHAPTER 7

INDIVIDUAL TRAINING AND EDUCATION

Army training underwent a profound change since the establishment of the US Army Logistics Center in 1973. Innovations were many and far reaching. Under the guidance of Generals DePuy and Starry, TRADOC led the way with its emphasis on individual and unit training. As part of this effort, TRADOC created the systems approach to training in the development of new concepts. This approach "ensured that each component of a system was examined in detail in order to develop knowledge about the components, their interrelationship, and dependencies. This examination permitted quantitative measurement of a system's worth and its limitations. Information was developed which formed the basis of decisions as to the cost of the system, how it could be improved, whether it should be replaced, and whether it was operating at its designed efficiency and, if not, why?"[1]

The Impact of EPMS and OPMS

The creation of the Enlisted Personnel Management System (EPMS) and the Officer Personnel Management System (OPMS) during FY 74 and FY 75 played a major role in this new training system. Implementation of these 2 systems necessitated thorough revisions of then current programs of training, evaluation, classification, and promotion. The LOGC was a prime mover in these two areas and during FY 77 and 78, worked to improve both systems.

EPMS. With the implementation of CMF 23 on 1 April 1978, the LOGC role in the enlisted management program expanded from its narrow focus on the implementation of EPMS to all enlisted professional development activities. While still providing guidance to the schools, the LOGC's need to check each EPMS document stopped. Enlisted professional development now encompassed participation in studies which impact on enlisted career development.[2]

OPMS. In implementing the Officer Personnel Management System, the Center briefed several DISCOM command designees, coordinated the QMS and OCC&S revision to Professional Military Education tracking task with examination questions, conducted several liaison visits to the associated schools and the TRADOC Institutional Training Division, and evaluated the C&GSC selection list for 1977. The Center also reviewed the draft PAM 600-3, Officer Professional Development and Utilization, and submitted a description of a logistician to DA. Additionally, the Center hosted a TRADOC conference to develop and implement a CSS Pre-Command Course, and in coordination with the TRADOC Study Group, developed a task list for G-4 positions at echelons above division.

In an effort to assist all Army service schools in providing the best possible instruction in the logistics area to all officers and enlisted attendees, LOGC representatives conducted liaison assistance visits to selected Army service schools and provided on-the-spot information and assistance. They reviewed the programs of instruction for content and doctrinal accuracy.[3]

Logistics Baseline Curricula

The LOGC revised and distributed the Logistics Baseline Curricula to each Army service school and major headquarters. These baselines reflected the most current logistics doctrine and thought from the Center and its 4 associated schools. The baselines included logistics doctrine from each of the proponent schools for officer advanced, officer basic, and noncommissioned officer courses. They recommended the number of hours of logistics instructions to be taught for each major subject. Each major topic had the address and phone number of the proponent school so that additional assistance was readily available to instructors and training developers. The proponent schools now made available lesson plans, handout materials, and training aids.

During the first half of FY 78, in conjunction with its associated service schools, the LOGC completed the revision of the supply portion of the Logistics Baseline Curriculum for use in Officer Basic and Advanced Courses. This revision encompassed requirements generated by the US Army Chief of Staff's directive to implement the recommendations of the Inspector General's Report on Management and Accountability of Army Materiel. Beginning 1 May 1978, Army service schools taught selected supply procedure subjects.

A total revision of maintenance training was undertaken and should be ready for distribution by FY 79-2. Recent changes in AR 710-1 and AR 735-11 required major revisions of the supply instruction and this was scheduled for distribution during the same time period. "In all cases," General Smith wrote TRADOC, "we are publishing performance oriented training objectives and providing manuscript lesson plans to reduce training development requirements at the nonlogistics service schools." And while an NCO Logistics Baseline Curricula was urgently needed, manpower constraints precluded the Center from undertaking this until FY 80.[4]

Service Schools Logistics Program of Instruction (POI)

Two of the most important events in support of service school logistics POI were the Logistics Instructors Conferences II and III, conducted at the LOGC, 19-21 July 1977 and 25-27 July 1978, respectively. The conferences served to update service schools' logistics instructors and

training developers on current logistics doctrine, policies, and ongoing studies. They provided a forum where attendees discussed, questioned, and exchanged ideas with other people responsible for developing logistics doctrine. Representatives from within the Army and from other agencies attended.

Coordination conferences and staff visits during FY 78 supported the development of property accountability instruction in Army noncommissioned academies. This marked the LOGC's initial efforts to implement logistics instruction in the NCO academies. Units visited included the 197th Infantry Brigade; Fort Benning NCOA; US Army SGM Academy; and the US Army Infantry School, Fort Benning.

During the last half of FY 78, the Center emphasized completion of the materiel maintenance portion of the Officer Basic and Officer Advanced Logistics Baseline curriculum. Selected nonassociated service schools and the US Army Administration Center reviewed the draft performance objective statements and provided comments to the Ordnance School for consideration. Publication was scheduled for January 1979.[5]

Training Effectiveness Analysis (TEA)

In his letter of 4 February 1975, GEN DePuy charged the school commandants to analyze the training effectiveness for materiel/equipment/ weapon systems for which they were proponent. His letter included a draft Operations Research Methodology paper providing standard guidelines to approach the analysis of training; i.e., identify training systems weaknesses, analyze the problem, develop alternative training techniques, and discover how to support and train in spite of constrained resources. The letter went to the Logistics Center's associated schools' commandants; LOGC did not receive information copies.

The letter directed the schools to forward DD Form 1498 (Research and Technology Work Summary Form) to their appropriate integrating center NLT 20 June 1975. The four LOGC associated schools submitted a total of 13 studies directly to HQ TRADOC without LOGC staffing or directorate action. In addition to the studies submitted by the associated schools, the Center initiated three in-house studies.[6]

TRADOC further directed that Training Development (TD) studies be included with Combat Development (CD) studies in the TRADOC study program. The schools' CD elements coordinated and assisted the TD elements in preparation and staffing of studies and requests for contract support. TRADOC outlined guidance for the schools and integrating centers to use in review and revision of the FY 76-7T Study Program pending Army and TRADOC regulation revisions.[7]

The TRADOC staff rewrote the Operations Research Methodology paper on Analyzing Training Effectiveness, forwarded with GEN DePuy's initial letter to the commandants, and published it as TRADOC Pamphlet 71-8.

As a direct result of GEN DePuy's concern for effectiveness of school training, the TRADOC school model (Model 76) evolved. The school model reorganized TRADOC schools into the following directorates: Support; Combat Developments; Training Development; Evaluation; and Training. The single most important change generated by the reorganization, the Evaluation Directorate, ascertained the effectiveness of training and provided the feedback mechanism which facilitated improvements to the system.

The LOGC established an internal procedure to improve control over training analysis by the associated schools, with the Operations and Administration Directorate in overall program management control. The LOGC T&E Directorate retained responsibility for training implications and technological review of designated school submissions. T&E also monitored each study and maintained current status.[8]

Army Logistics Specialty Committee (ALSC)

AR 15-25, dated 23 March 1977, established the ALSC as a continuing intra-Army committee. The ALSC advised the ODCSRDA and the Deputy Chief of Staff for Logistics in discharging their DA proponent responsibilities for OPMS specialties. The Committee pooled the resources of the logistics community to develop coordinated changes to the methods used in developing and managing logistics officers. The Assistant Deputy Chief of Staff for Logistics chaired the ALSC, with principal representatives from the MACOMs and major DA staff elements. Normally, the Committee met semiannually at the call of the chairman in advance of the Army Logistics Policy Council. The regulation tasked LOGC to establish and support the ALSC with ad hoc working groups. Six proponent-related working groups emerged in coordination with the DA DCSLOG to support the Committee.

As a result of Quartermaster Work Group meetings and presentations to the ALSC, a proposal to realign quartermaster specialties was briefed to the OPMS Steering Committee on 22 February 1978. Basically, this proposal consisted of amalgamation of Specialty 93 (Logistics Services) and Specialty 83 (General Troop Support Materiel Management) into Specialty 92 (Supply Management). Specialty 92 was retitled Materiel/Services Management to better identify the functions involved. Further, the Army Logistics Specialty Committee and work group meetings were postponed pending resolution of findings in the CSA directed study on the Review of Education and Training of Officers (RETO).[9]

The New Initiatives

A number of new initiatives highlighted the implementation of the TRADOC training systems during this 2-year period, presenting the Center with many challenging and stimulating projects.

Pre-Command Course (PCC). TRADOC appointed the LOGC the program manager for a combat service support Pre-Command Course. This February 1978 tasking gave the LOGC responsibility to provide the 05 and 06 command selectee with a course of instruction which would reorient and update him in functional areas of logistics, as well as the latest Army programs and policies.10 The Training and Education Directorate assumed this mission and proposed a multiphase program incorporating maximum use of self-paced instruction.

Phase I provided the command selectee with study materials to re-acquaint him/her with current programs and doctrine approximately 45 days prior to Phase II. This offered the selectee an opportunity to reorient and become familiar with the latest doctrine and Army programs applicable to the selected command. A diagnostic test was given which the selectee completed and forwarded to the LOGC before beginning Phase II. This diagnostic test served as the basis for the instruction to be received in Phase II.

Phase II was conducted at either the LOGC or the LOGC associated schools. The site selected for instruction was based upon the type of unit that the selectee commanded. DISCOM and Separate Support Battalion selectees received this instruction at the LOGC. Functional command selectees returned to the appropriate service school; e.g., ammunition battalion commanders to USAMMCS, maintenance battalion commanders to USAOCC&S, etc. This phase provided the command selectee with a reorientation on the functional mission of the unit and training and maintenance management.

Phase III gave the future commander the opportunity to become acquainted with the peripheral systems that were common to all commands; personnel and finance systems, legal orientation, and organizational effectiveness. This block was conducted at Fort Leavenworth, KS, in conjunction with the combat arms PCC, since this phase was common to all commanders.

Phase IV provided all CSS selectees with a method to apply the skills gained in Phase II. A logistical war gaming simulation was used to reinforce the functional skills, as well as to reacquaint the future commander with management and leadership problems normally found in the type unit which he/she will command. Problems were presented which required the command selectee to apply all facets of leadership, management, and knowledge of the appropriate functional area.

The LOGC role grew from providing a Pre-Command Course for logistics unit commanders to becoming the proponent for the Combat Arms Logistics Course of Instruction. In this role, the LOGC provided logistics course of instruction guidelines to the five combat arms schools and reviewed them to insure that logistics objectives were met. It was anticipated that development of the combat service support PCC began with a limited front-end analysis of command positions in FY 79-1 through FY 79-3. The CSS PCC was to begin in FY 80-4. This start date and development plan was submitted to TRADOC for approval on 5 October 1978. The LOGC and LOGC associated schools have been given additional manpower authorizations to develop and implement the CSS PCC.[11]

Master Mechanic. TRADOC's 1976 Total Tank System Study concluded that mechanics/repairmen need more expertise to aid them in increasing the availability of armor vehicles. The study recommended the establishment of a master mechanic.

The tank consisted of many diverse major components; the failure of any one part caused a complete shutdown. To increase availability, the tank was treated as a system. This was especially true at the organization level. Consequently, it was proposed to establish a tank master mechanic; one individual capable of performing organizational maintenance on the total tank--automotive and turret portions.

The master mechanic concept envisioned a system-dedicated specialist, trained to support a selected combat vehicle. The tank master mechanic was superimposed upon current maintenance TOE using existing strengths. A master mechanic training concept was developed for the tank systems.[12]

As previously stated, the master mechanic should be capable of performing organizational maintenance on the total combat vehicle. To bring the individual to the required level of proficiency, he/she is required extensive training followed by mandatory utilization in his/her trained skills. Advanced individual training included organizational maintenance tasks in either the turret or the automotive portion of a specific tank. In addition, the tank mechanic operated and performed this maintenance on the recovery vehicle normally associated with the tank of his/her primary training; i.e., M48A5/M60A1 mechanics would be trained on the M88 (medium recovery vehicle). Upon graduation, the individual served a utilization tour. After commitment to remain in the service, he/she returned to the Ordnance School for Skill Level 3 training. There, the individual cross-trained in the portion of the tank not previously received (e.g., 63N trained in the turret portion of the M60A1/M48A5). Task lists currently being prepared indicated it was more economical to conduct this training at the Armor School. A final decision on training location was made after completion of task analysis.

Graduates of the Skill Level 3 training were to be called systems mechanics and were to be identified by the MOS which indicated the system. Skill Level 4 or master mechanic training was to be conducted at the Ordnance School. The individual attended during his/her 7th or 8th year of service to learn the balance of the skills necessary for him/her to become a master mechanic.

To provide both systems mechanics and master mechanics at the earliest possible time, selected individuals in grade E5 thru E7 with training and/or experience in either turret or tank/automative maintenance, entered the systems mechanic or master mechanic course as appropriate. This concept provided a hands-on mechanic for a specific combat vehicle, with formal training and technical expertise gained from utilization assignments.

In order for this concept to be viable, it required intensive personnel management, formal school training at specific points in a career, utilization assignments, and career incentives to attract and retain members. The LOGC, the Ordnance, the Armor Field Artillery, and the Infantry Schools have coordinated in developing this concept and training development actions. The goal was to test the master mechanic concept in a phase of the Restructured Division Test.[13]

The Training and Doctrine Command now prepared instructional material to support the reorganization. The Army expected to begin developing master mechanics and master repairmen in FY 79.[14]

Officer Common Task Development. The Officer Common Task Development effort comprised one phase of an overall officer job and task analysis being implemented by TRADOC at the recommendation of the Review of Education and Training of Officers study. This program of officer job/task analysis and training development hoped to meet the requirements of the Army of the 1980's. Scheduled for 1985 completion, this long-range program provided a detailed description of all officer jobs at grades 01 through 06 and warrant officers 01 through 04. The analysis identified those tasks and skills which must be included in the officer education/training system. A detailed analysis of officer jobs appeared to be the key feature of the program.

Building upon data developed for the RETO study, specialty training proponents, in conjunction with the integrating center and MILPERCEN, drafted comprehensive lists of officer/WO tasks for each specialty/MOS. Completed task lists underwent field-validation using data from field questionnaires. Survey results were analyzed to assist DA and the trainer in making and defending decisions on occupational content and to support TRADOC decisions on what to train and how to allocate training resources. The first pilot was scheduled to commence in January 1979

and included the following basic entry specialties: Specialty 11, Infantry; Specialty 13, Field Artillery; Specialty 31, Law Enforcement; Specialty 73, Missile Materiel Management; and WO MOS 214E, Missile System Technician (PERSHING).

A second pilot program surveyed field grade officers in selected basic and advanced entry specialties. Results of these pilot surveys were used to improve methodology and adjust milestones, as necessary. A phased survey program followed the pilot efforts. Initial surveys included only lieutenant and captain tasks.[15] Surveying for all officer grades followed the second pilot program.

Militia Careers Program (MCP) Pilot Test. The Logistics Center became involved in the MCP in July 1977 when DA DCSPER hosted a conference in the Pentagon. In September 1977, T&E participated in a working conference at Fort Monroe to discuss implementation of MCP.

DA DCSPER hosted a working conference in Johnstown, Ebenburg, and Altoona, PA, on 26-27 October 1977, to evaluate vocational-technical (VO-TECH) high schools' capability to teach the designated MOS related subjects. The T&E Directorate was briefed on the organization and operation of the Johnstown and Somerset AVO-TECH and conferred with AVO-TECH instructors and school administrators and inspected training facilities. Two of the associated schools (QMS and ORD) recommended support of the program to teach MOS 43M, 76P, 94B, 44E, 63B, and 63C. T&E continued to support and monitor as required.

Upon review of the rough draft of MCP, T&E attended a conference to finalize plans of implementation at Fort Monroe on 8 December 1977. On 28-29 March 1978, a working conference convened at Altoona and Johnstown. The T&E Directorate reviewed and concurred with the final version of the draft proposal and assisted in coordinating the details necessary to insure desirable implementation of MCP. As the program was established to adopt an advanced entry/accelerated promotion strategy similar to the civilian acquired skills program, the pilot test commenced with school year 1977-19[illegible] recruiting high school seniors in the spring, 1978.[16]

Logistics Systems Training - Integration of New Doctrine

In November 1976, a new project was established to insure the development, initiation, and maintenance of functional training to support all logistics systems. These systems included, but were not limited to, the Standard Army Intermediate Level Supply Subsystem, Combat Service Support System, Direct Support Unit Standard Supply System, Standard Army Maintenance System, Standard Army Ammunition System, and the Standard Property Book System. As new logistics systems appeared, training to support them was developed concurrently.

SAILS ABX training began at the QM School during FY 77. Courses of instruction in this enhanced version of the system were offered officers, warrant officers, and enlisted personnel. Through the efforts of the school and this Center, MILPERCEN approved an Additional Skill Identifier (ASI) for award to enlisted graduates of the SAILS ABX course. The school established a SAILS System Analyst program in conjunction with MILPERCEN, USACSC, and this Center to provide selected captains training necessary to help improve SAILS operations at the COSCOM level.[17]

The coordination of training between ALMC and the QMS in the SAILS area was formalized. This Center conducted two in-process training reviews which developed recommendations from the field commands for revision of the ALMC resident course. During FY 77, 271 students graduated from ALMC SAILS resident course.[18]

In a 9 February 1977 letter, the CG, LOGC, clarified and delineated SAILS training responsibilities. He designated ALMC the institution to provide the basic body of instructional knowledge and training materials to all TRADOC schools, Army-in-the-field elements and Reserve Components and the QMS the organization to direct training for Army-in-the-field personnel.[19]

LOGC launched quarterly meetings of ALMC and QMS personnel to insure a coordinated approach to SAILS training and to minimize duplication. The first such session occurred on 17 October 1977; it reviewed each school's training program and discussed the integration of SAILS ABX instruction into existing resident and exportable courses. As a result, it devised a new schedule for the development of journeyman level exportable modules and it tailored QMS course offerings more closely to the student population.[20]

To insure continuing coordination between ALMC and the QMS in the development of resident and exportable training material, this Center chaired a 3 May 1978 meeting of the schools involved in SAILS training. A formal SAILS Training Review followed on 13 September 1978. The review approved the FY 79 training programs of the schools; established MACOM quotas; prioritized the development of exportable SAILS ABX training material; and received MACOM comments relative to the effectiveness of SAILS training.

During FY 78, ALMC completed the development work on the SAILS PLUS exportable module. In addition, the schools conducted resident training for Reserve Component personnel of the 167th MMC Alabama NG and the 55th MMC of the 310th TAACOM. This training filled a definite void in training of reserve materiel management personnel.[21]

The LOGC reviewed System Training Management Plans for both SAMS and DS4, dispatched an initial draft of the SAMS System Training Management Plan to the field. The plan provided a basis for forecasting resources needed for the development and extension effort. As a result of the emphasis placed on SAMS, the OCC&S ceased development of an exportable Maintenance Reporting and Management training package.[22]

The establishment of a DS4 resident training program prompted a dialogue with the QM School. As a result, DS4 division level resident training was scheduled to begin in August 1979 and the school worked toward that goal. Training development actions were undertaken and school personnel attended the Instructor and Key Cadre training session conducted by this Center in September.

To support resident training on the Decentralized Automated Service Support System (DAS3), the Center developed an Individual and Collective Training Plan and submitted it to TRADOC in July 1977. The DAS3 Individual-Collective Training Plan was revised in March 1978 to reflect the QQPRI decision which made the functional individual (MOS 76P) responsible for ADP operations. As a result, the QMS became responsible for functional and ADP operator training, relieving the US Army Institute for Administration of that requirement. The LOGC coordinated the revised ICTP with affected activities and schools at a 2 March 1978 coordinating conference and forwarded it to TRADOC on 10 March 1978.[23]

Integrated Technical Documentation and Training (ITDT)/Skill Permance Aids (SPA). An important element in the total systems concept, ITDT, began in 1975 as a joint TRADOC and DARCOM effort for developing improved technical manuals and training materials.

ITDT provided the user with a simplified document that can be used in two ways: first, as a reference for operating and maintaining Army equipment, and second, as a training text for both school training and on-the-job training. ITDT integrated all the information needed to operate and maintain an equipment system into technical manuals and training materiels. The system technical manual used a step-by-step format and relied heavily on illustration. The manual's clear presentation helped the soldier complete maintenance work with the minimum of training and supervision. As the primary training text, the manual was supplemented by written and audio-visual training materials, designed to give the soldier practical experience in the skills necessary to operate and maintain equipment.

In its efforts to improve maintenance operations and associated maintenance training, the LOGC continued its active coordination with DARCOM to insure that ITDT remained a feature of systems in all phases of materiel development. The contracts awarded by DARCOM on the two

demonstration projects, Tank Turrets and Wheeled Vehicles, were scheduled for completion in late CY 78.

The Center worked closely with the Ordnance and Armor Schools, HQ TRADOC, and the Training Support Center to develop the basis-of-issue plan and the marketing program for the materials produced as a result of these demonstration projects.

TRADOC approved the marketing plan, in concept, on 17 August 1977 and provided advance information to field users, ranging from skill level I mechanics to MACOM commanders, on the purpose, manner of use, and potential benefits of the materials produced by the project. The proponent schools completed the basis-of-issue plan in December 1977. It identified quantitative requirements for the ITDT materials and the method of distribution, and it served as an initial estimate for the programing of funds for printing and distribution.

In addition to the tank turret and wheeled vehicle projects, the battery computer system, TACFIRE, XM-1 Tank, TOW, DRAGON, and the Missile Minder fell under contract for ITDT application. Fielded systems proposed for FY 78 included the M60 Chassis and government-funded equipment for the XM-1 such as the AN/VRG-12, 50CALMG, and the Protective Mask. Final selection depended upon the availability of funds.

In August 1978, at a briefing conducted for the Army Chief of Staff, the term Skill Performance Aids was chosen to replace Integrated Technical Documentation and Training as the official name of the program.[24]

New Equipment Training (NET)

During this period, T&E Directorate monitored and participated in New Equipment Training (NET) courses which provided transfer of knowledge from the contractor to the proponent LOGC associated school. Courses of Instruction (COI) developed from NET guaranteed sufficient school-trained logistics personnel to support Operational Testing and the new fielded equipment. In January 1977, AR 1000-2 compressed the new equipment development timeframe. The net effect eliminated OT III and established follow-on confirmatory testing.[25]

The impact of AR 1000-2 was transitional during FY 78. Major items of new equipment that were already proceeding into OT II or OT III continued in their development with minimal impact. However, new items of equipment came under the new accelerated testing policy. Selected new/modified materiel systems were managed intensively for training impact. The following projects were representative of these systems:

ROLAND II: A short-range, all-weather, air defense missile system scheduled for deployment in the early 1980's, ROLAND replaced the current CHAPARRAL system. The LOGC helped the USAADS and USAMMCS prepare for OT II and develop their Training Device Requirements (TDR). The Hughes Company and Boeing Aerospace Company held a ROLAND Staff Planners Course for staff officers. LOGC representatives attended these SPC. In April, the Center briefed the new TRADOC System Manager on ROLAND, the training of logistics support personnel, ITDT, and the training annex to the Development Plan.[26]

The ROLAND short-range air defense missile system program entered OT II in March 1978 and ran through August. It won't test logistics training; this will be accomplished during the follow-on evaluation after Initial Operations Capability. The USAADS initiated the COEA and the MMCS provided cost data on basic and improved CHAPARRAL maintenance training for the Cost and Training Effect Analysis (CTEA). The class operator trainer was forwarded to DARCOM during January, with a projected cost of $3M per copy and a 1980-1981 procurement.

The first US ROLAND firings took place during February 1978. Logistics testing during Performance Qualification Test will be limited to organizational level with the contractor providing all other support. ROLAND ASARC III was scheduled for March 1979. Initial production facilitization began in June 1978 and was to terminate in January 1981. The maintenance concept for the OMTS and Operational Proficiency Training Equipment has been established.[27]

PATRIOT: A medium-range, air defense missile system that used one radar to do the work of nine radars in the current HAWK System, PATRIOT was scheduled for deployment in the mid-1980's. The Missile System PM notified the LOGC of the decision to accelerate the PATRIOT program by two years. This decision brought the project off-the-shelf where it had been placed by the Secretary of Defense in January 1974. Formal ASARC approval was given in February 1978. Training remained on schedule; three SPCs have been conducted.

TRADOC proposed training requirements for training devices were reviewed, agreed to, and costed by the PATRIOT PM Office. The PATRIOT PM visited the LOGC on 7 September 1978 to brief on the PATRIOT Maintenance Enhancement Program. The final draft PATRIOT ICTP was reviewed and commented on by the LOGC during October 1978.[28]

Improved TOW Vehicle (ITV). The ITV, a new TOW weapon station mounted on a modified M113A1 armored personnel carrier, permitted the gunner to fire and direct the TOW missile to its target from within the turret of the ITV by use of the day, night, and target acquisition sights. Prior to its introduction, the TOW gunner was exposed to hostile

fire during missile launch and guidance to target. The ITV entered a compressed development cycle early in CY 77 following a decision by the Source Selection Authority and DA to proceed directly from the DT/OT I to DT/OT III phase of development.

During 1977, the LOGC and the logistics associated schools provided the necessary input to finalize the training device requirements for the ITV. The two major training devices were the Turret Trainer and Evasive Target Simulator (ETS). The TT consisted of a platform mounted ITV turret which has cut-away components to permit a higher student-to-instructor ratio. The ETS eliminated the need for a TOW range, towed target boards, etc., as the gunner/crew can be trained to fire, guide, and hit the target by simulation.

Since the ITV was on an accelerated development cycle, the requirement to field the system with Integrated Technical Documentation and Training cannot be met without slippage in the established fielding date. To preclude this, the LOGC recommended the ITV proponent school request a waiver of the ITDT requirement and action be taken to have ITDT applied to the ITV coincident with the family of M113 vehicles. TRADOC granted the waiver and included the ITV system with the M113 family conversion during CY 79. Since the compressed development cycle of the ITV precluded requisite training and fielding of support personnel by the fielding date, this Center recommended that ITV test/player personnel be stabilized for the duration of the test.[29]

The ITV continued to move closer to its fielding date. In conjunction with DA MILPERCEN, USAIS, USAARMS, and the USAOCCS, the LOGC settled on an MOS to maintain the T-BATT Turret at the organizational level. Pending approval of the Master Mechanic Concept, which has a systems specific mechanic designated for the ITV, the current M60A1 turret mechanic received three weeks of add-on training and was awarded an ASI denoting him as an organizational turret mechanic for the system. The USAOCCS, USAIS, USAARMS, and USAREUR identified their requirement for training base vehicles. These requirements have been passed to the TRADOC TSM and the DARCOM PM (OCCS-0, USAIS-32, USAARMS-24, and USAREUR-5). Finally, the TRADOC community, DARCOM, and the contractor coordinated their activities to insure that the turret trainer is available in the October 1978 timeframe. This permitted fielding of the turret trainer concurrently with the ITV system. The only issue remaining at the close of the period was the decision on training sites and the fate of the evasive target simulator.[30]

XM-1. During FY 77, the contractor (Chrysler Corporation) conducted XM-1 Staff Planners' Courses at Warren, MI; three LOGC members attended this course.

In coordination with the logistics associated schools, the LOGC provided in May 1977 the PM XM-1 Courses of Instruction for all Government Furnished Equipment integral to the XM-1. Since maintenance requirements for XM-1 fall within multiple proponent areas, the LOGC tasked OCCS to coordinate with PM XM-1, the Signal and the Engineer Schools to determine the maintenance support concept for Test Measurement Diagnostic Equipment. The support concept was finalized during CY 78. PM XM-1 provided that standardization efforts on the XM-1 tank include specific areas (not complete metrication) one of which is to have metric tools on board the vehicle for crew level tasks.[31]

After development of a coordinated position, this Center recommended that if metrication is applied to the XM-1 tank, every effort should be made to metricize the total system. This increased the cost of the XM-1 tank system; however, partial metrication created additional costs and problems. Additionally, in an effort to prevent problems with refueling vehicles, the Center suggested coordination with the US Army Quartermaster School and the US Army Ordnance and Chemical Center and School on all matters affecting oiling, greasing, and fueling.[32]

Heavy Equipment Transporter (HET-XM915-920 Series Vehicles). Since these vehicles were commercially designed "off-the-shelf," DARCOM and TRADOC waived the normal developmental process. However, TRADOC scheduled a Force Development Testing and Experimentation during September 1978.

On 16 February 1978, the LOGC participated in a meeting to develop a plan for user participation in the verification of draft equipment publications for these vehicles. The plan called for participation by the TRADOC Schools (USATSCH, USAES, and USAOCC&S) which sent target population personnel to the contractor's location to review and comment on manuals developed in support of the vehicles. The revised manuals were then used during the conduct of the FDTE in September 1978. At the close of this period, training for instructors, key personnel, and test participants, as well as a review of the Basis of Issue Plan, remained to be done. Finally, a determination needed to be made concerning the applicability of the XM915 series vehicles to ITDT, and the establishment of a milestone schedule.[33]

TACFIRE (AN/GSG-10). As an automated command and control system, TACFIRE provided more efficient management of field artillery firepower. One of several under the PM ARTADS, the system integrated fire direction complexes that used digital computers, local and remote I/O devices, digital data storage and retrieval units, graphical display units, control consoles, and other equipment combinations appropriate to the echelon and functions performed. Computer centers were provided at fire direction centers, at division and artillery group headquarters, and at each direct support, general support, and reinforcing cannon artillery

battalion. Remote TACFIRE equipment was employed by the division fire support element, forward observers, fire support officers, missile battalions, and the firing batteries. Early fielding of the system was planned.

During FY 77, USAFAS and USASIGS conducted OT III maintenance training, including direct and general support maintenance training. The GS training used the AN/USM-410 Automatic Test Support System in maintaining the numerous printed circuit boards used in the system.[34]

The Center identified the need for USASIGS, USAOCC&S, and USAFAS coordination on the decision to use MOS 34G for DS, coordinated the training requirements to support the GS maintenance concept for the TACFIRE OT III with the PM ARTADS, US Army Tobyhanna Army Depot (TOAD), USASIGS, TECOM, and TCATA. The Centers also provided the MOS and training implications for the TACFIRE Digital Message Device Support Concept and it suggested the USASIGS assume proponency as the logistics oriented school to avoid further problems in planning and developing resident training, training equipment, training devices, facilities, and MCA funds based on similar ARTADS materiel.

An abbreviated OT III was conducted in January 1978 at Fort Hood, TX. Due to the short test and limited availability of the AN/USM-410, automatic test equipment, Tobyhanna Army Depot provided the GS support.

Problems encountered in using MOS 34G, Fire Control Computer Repairman, and the additional TACFIRE training at the Field Artillery School provided for the Ordnance and Chemical Center and School MOS became an issue when the Signal Center and Fort Gordon submitted, in December 1977, a request to TRADOC for implementation of two new MOS into the Automatic Data Processing Career Field CMF 74. This action included the requirements for TACFIRE DS and GS maintenance along with other tactical data systems requiring a similar approach to maintenance. TRADOC sought help from the LOGC in February 1978 to resolve the problem.[35]

Missile Minder (AN/TSQ-73). An improved system for the control and coordination of Army surface-to-air guided missile air defense systems, Missile Minder, was housed in a mobile shelter that included electronics equipment, operator and display consoles, and repair and maintenance facilities. Initially designed to function without DS and GS maintenance, the system required an operator through DS and GS maintenance of printed circuit boards (PCB). The LOGC proposed a GS level PCB repair concept. PM ARTADS supported this following extensive LOGC coordination with the RCA, the Signal School, Air Defense School, Missile Command, and OTEA.

The LOGC directed the USASIGS to establish an Automatic Test Equipment operation and maintenance training program to include fault isolation

and test of repaired PCB, and requested a course of instruction on precision soldering techniques used in PCB repair. The PM ARTADS obtained LOGC support for his plans to deploy the system early in Europe. Planning and training were completed for OT III player/logistics personnel and the PCB repair concept using ATE (AN/USM-410) was evaluated during the Missile Minder OT III at Homestead, FL, based on the USASIGS training program. The evaluation proved successful and the training program was expanded to support testing programs for other new systems.[36]

The Signal School reviewed ATE and PCB training efforts of the Navy and planned for a system of certification of personnel involved with the repair PCB to improve quality and reliability. Extensive recommendations were made to improve the Materiel Fielding Plan and training plans for the maintenance support (to include the new GS repair concept) for early deployment of the Missile Minder to Europe in November 1977. A follow-on OT I test of the supporting Automatic Test took place during January - May 1978 at Pirmasens Army Depot in support of AN/TSQ-73 and selected FM radios.[37]

Tactical Operations System (TOS). An automated command and control system TOS functioned as the focal point for a number of improved communications, sensors, SIGINT/EW and other battlefield systems, such as Missile Minder and TACFIRE, to exchange data with other cooperating tactical data systems, to provide data base management, analysis support, and a display capability for the Modern Army System. TOS integrated and employed battlefield systems that fight, support, and sustain the battle. TOS consisted of an integrated assembly of hardware (computer main frames and peripheral equipment), software (computer programs, data base, operating procedures) and personnel (operators and maintainers of hardware and software). The system currently utilized some TACFIRE peculiar items with logistics support similar to that planned for TACFIRE.

PM ARTADS and the Army service schools completed planning and coordination for the personnel and training portion of the Development Plan, an updated ROC, a revised CTP for a test at Fort Hood, TX (to justify early fielding of the system to Europe), and a 5-phased training program for total TOS deployment. They also reviewed the system specifications for training implications.[38]

In early 1977, the PM ARTADS hosted a training conference, with LOGC participation, at Fort Hood, TX, to formulate training requirements. The LOGC designated the Signal School as the logistics oriented school with CACDA as the proponent. The LOGC reviewed the QQPRI for the interim TOS configuration (TOS 79) at an ILS planning meeting. A new configuration of TOS with different development items was designed for use for an OT II in 1980.[39]

HELLFIRE. The LOGC reviewed and discussed the HELLFIRE Draft Test Support Package (TSP) during September 1978. In order to validate the HELLFIRE Logistics Support Concept and to test the missile system employment concepts/capabilities, a HELLFIRE OT II was planned utilizing AH-1 Test Bed Aircraft.[40]

TOW Weapons System/TOW Field Test Set (TFTS). The deployment of TOW Missile System coupled with the subsequent deployment of the TOW Field Test Set generated a situation of concern. Notwithstanding ongoing actions to improve the situation, the CG, USALOGC, in his letter of 28 October 1977 to both NGB and OCAR, articulated these concerns. The difficulties encountered in production of a viable training program tailored to the unique constraints of the Reserve Components were discussed at great length during a coordinating meeting at HQ TRADOC in mid-January 1978. As a result of this meeting, the USALOGC was tasked to be the TRADOC Executive Agency to coordinate missile maintenance training within the Reserve Components.

The ongoing TOW Trainer's Course at Fort Benning, GA was deemed a very satisfactory method of cadre training for Reserve Component gunners and organizational maintenance personnel. Accordingly, LOGC attention focused on the development of a support maintenance training capability. Both the contractor (Hughes Aircraft) and the Missile Readiness Command conducted introductory training, but this training did duplicate the contents of the 27E MOS course (Wire Guided Missile Repairman Course). Since the 27E resident course ran almost 15 weeks and the TFTS add-on required approximately three additional weeks, time was the major constraint for the RC. To offset this, USAMMCS developed a nonresident/resident training course of instruction specifically for RC use. This course, which combined self-paced nonresident training with resident (USAMMCS) training coincident with annual training periods, required some 25-30 months to complete.

To date, TRADOC had not officially approved the COI. Efforts to accelerate the TRADOC approval continued. The ultimate approach to successful training within the RC appeared to be the development of a RC internal training capability. The development of a cadre to provide this capability progressed more slowly than desirable. To accelerate this capability, the LOGC generated a requirement for an internal assessment of NGB training capability and coordinated with USAMMCS and DA DCSPER to allow additional RC inputs to the 27E course at USAMMCS. Finally, during April 1978, the Center coordinated an orientation on support maintenance directed toward trainers at the National Guard Professional Education Center, Little Rock, AR.[41]

Improved HAWK Product Improvement Program (IHAWK PIP). Introduced in 1972, the Improved HAWK system represented the principal air defense

capability of the US field forces. In order to maintain the system as a viable "state-of-the-art" air defense system, a major product improvement program was initiated with a funding of $200,000,000. The overall PIP package involved eight distinct actions, the first four being: (1) Improved Continuous Wave Acquisition Radar Transmitter; (2) The Pulse Acquisition Radar Digital Moving Target Indicator; (3) The Army Tactical Data Link, and (4) On-Board Communications - a single block installation by one contractor.

The IHAWK system was evaluated for ITDT format, but both DARCOM and TRADOC recommended the system publications not be converted to ITDT. The efforts began in early FY 77 and resulted in the current TMs which utilize branch and flow (also called troubleshooting tree) troubleshooting diagrams.

Along with USAMMCS, TRADOC, and MILPERCEN, the LOGC sought to resolve deficient areas. USAMMCS, USALOGC, USAADS, TRADOC, and MILPERCEN jointly developed a revision to the IHAWK subfield of Career Management Field (CMF) 23, Air Defense Missile Maintenance. The revision, effective October 1978, corrected existing grade imbalances.[42]

General Support Rocket System (GSRS). The General Support Rocket System received the developmental "go ahead" in January 1977. Having a rapid fire capability of unguided rockets, the system was considered the most cost effective method to counter the Warsaw Pact numerical superiority artillery. Utilizing a modified version of the chassis used with the Fighting Vehicle Systems, the GSRS development process accelerated from the "normal" Life Cycle System Management Model to a development cycle of 60 months. This acceleration moved the system from DT I/OT I into a maturation phase (production). The system tests were critical, since OT I were expected to deliver the results of a normal OT II. If the system performed satisfactorily through the points identified in the outlined test plan, production scheduled was for April-May 1980.

The LOGC representative at the 28 March 1978 training and test meeting (Fort Sill, OK) recommended strongly that GSRS PM and GSRS TSM execute some form of Memorandum of Agreement to identify the "normal" developmental logistics actions which may be bypassed in the accelerated process and to document their subsequent completion. They voiced similar concern over the lack of logistical play during the OT. To offset this, the LOGC and the USAOCC&S pushed for and obtained agreement from both the PM and TSM for a maintenance "tear down" prior to QQPRI finalization. Development continues on this system with design being built around the TACFIRE (Tactical Fire Direction System) and BCS (Battery Computer System). Current indications indicated that the system will meet the accelerated schedule.[43]

A training and organization meeting for GSRS was held 11-15 September 1978 at Fort Sill, OK, to review the projected training program and the organization employment and deployment concepts. Boeing Company and Vought Corporation competed for development of GSRS. Boeing projected a requirement for three MOS skills needed to maintain their launcher: a 13B (Field Artillery Crewman), a 34G (Fire Control Computer Repairman), and a 45L (Artillery Repairman). Vought also required MOS 34G and 45L for support maintenance of their launcher; however, they propose an MOS 15D (Lance/GSRS Crewman) for operator/ organizational maintenance.

A critical milestone in the accelerated program, OT I, was planned for 7-21 January 1980. During September - October 1979, TRADOC instructor personnel were to be sent to each contractor site to be trained on the equipment by the contractor. These instructors were to instruct player personnel who will participate in the validation phase. For GSRS there was no OT II scheduled; however, a follow-on evaluation was contemplated for April 1982.

Both contractors prepared Military Specifications 63035-63040 (less 63039), extension training material, job performance guides and draft equipment publications (-10, -20, -34, -14 test equipment, -14 training equipment). These documents were to be delivered to the PM and TSM on each system design beginning in mid-1979. The Field Artillery School was organized to begin work on GSRS field manuals.

The TSM briefed TRADOC on 27 September 1978 and recommended a configuration of three batteries having nine launchers per battery. The maintenance concept for GSRS peculiar equipment proposed DS/GS maintenance by the missile support companies of the DISCOM/COSCOM. Skills (MOS 45 and 34G) to support GSRS equipment were found in FSC of brigades, Light Maintenance Companies of the DISCOM and corps units.

Integration of New Doctrine

Under this program, the Center provided the logistics associated schools the latest information on new or modified doctrine. This effort enabled the schools to update instructional material insuring, thereby, that students received the most current doctrinal guidance. As part of this task, logistic trainers participated in the following diverse programs:

a. Evaluated the US Army Training Center's capability to assume additional advanced individual training load from the QMS. This involved the Food Service Specialist, MOS 94B, and the Supplyman, MOS 76Y.

b. Provided initial guidance to the QM School on the Continuing Balance System Expanded concept of asset accounting and control. Since this system was introduced by the DARCOM Depot System Command, existing supply instructions required revision.

c. Provided the latest status of the Containerized Shipment and Storage of Ammunition project to the associated logistics schools. DA approved COSSA in October 1977.

d. Participated in the evaluation of an USADMINCEN new doctrinal concept for conducting Weapon System Replacement Operations. Additional exploratory work was required with the ADMINCEN before this concept could be introduced into courses of instruction at the logistics schools.

e. Evaluated training recommendations from the Division Materiel Management Center test at Fort Hood to determine impact on existing instruction. This resulted in a LOGC position that the QMS continue its ongoing active support of the field with both exportable and resident training programs.[45]

f. Initiated a project to study Materiel Management Training requirements. This was assigned to the QM School and involved an extended research effort. As the effort evolved, logistics system training emerged as a possible problem.

g. Dispatched guidance on the integration of approved Division Logistics Organization Structure recommendations into courses of instruction. DA approved two recommendations which impacted on all logistics schools.

h. Participated in an ongoing effort to minimize the impact of change on doctrinal publications and on instruction. This impact has been most pronounced in the SM and SQT areas where changes have invalidated these training publications. During the period, the QM School obtained exceptions to existing TRADOC guidance which ameliorated the problem for that school. This action continues until the management of change becomes a reality.[46]

Army Oil Analysis Program (AOAP). The Army Oil Analysis Program became part of a DOD-wide effort to detect impending equipment failures through analytical evaluations of oil samples using spectrometric and physical tests. The spectrometric analysis identified and measured metals that showed abnormal wear. Improved maintenance, higher operational readiness, and the avoidance of many catastrophic component failures for both aeronautical and nonaeronautical equipment reflected the benefits of AOAP.

AR 750-22, Army Oil Analysis Program, appointed DARCOM PM and established the responsibilities for the AOAP. DARCOM designated the US Army Materiel Readiness Support Activity AOAP manager with responsibility for planning, coordinating, developing, and administering a single oil analysis program in coordination with all major Army commands. CG, TRADOC, responsibilities include incorporating the AOAP into applicable existing training programs. The AOAP expanded in 1975 to include selected nonaeronautical equipment (tank engines) and further swelled in 1976 to include selected combat and construction equipment (using diesel engines), watercraft and locomotives.

In January 1978, MRSA asked the LOGC for assistance in the introduction of AOAP into the current curricula of the various Army schools which teach operational maintenance. MRSA agreed to provide assistance, as necessary, including technical data to the schools in the development of COI and lesson plans pertaining to the oil analysis program.

The LOGC requested the Armor, Engineer, Field Artillery, Ordnance and Transportation Schools furnish information as to type of instruction being presented on AOAP, the level of instruction, and if possible, copies of the pertinent COI. Responses indicated that the Armor, Artillery, and Transportation (aviation maintenance) Schools provide AOAP instruction; the Engineer and Ordnance Schools do not. The latter two schools, however, requested assistance and technical material from MRSA for use in development of COI.

The LOGC monitored and assisted the schools in the development of training materials and incorporating AOAP training into applicable courses of instruction and worked very closely with MRSA, providing assistance in furthering the AOAP program.[47]

NICAD Battery Maintenance. TRADOC tasked LOGC on 5 December 1977 to develop doctrinal and organizational concepts for the storage, charging and maintenance of NICAD batteries. The T&E Directorate surveyed the service schools to determine the extent of maintenance instruction on NICAD batteries included in their courses of instruction. The survey revealed that this training was limited to the batteries peculiar to each specific MOS. The hours of instruction varied accordingly, ranging from none to eight.

The scattering of NICAD battery training among the various schools left its proponency unclear. After informally coordinating with the Signal School, the T&E Directorate recommended the USASIGS be designated the logistics oriented school for NICAD batteries. This question was under study at the close of this period.[48]

Lead Acid Battery Maintenance. ODCSLOG directed LOGC on 5 July 1978 to form a JWG to define problems and to propose corrective actions related to lead acid battery distribution maintenance and reliability. The JWG reviewed recent TM and DA PAM for lead acid batteries and coordinated proposed changes with DARCOM, updated and changed appropriate FM, provided TOE modifications for ORG, DS/GS levels and prepared requirements documents for an improved lead acid battery.

The JWG first met 25 July 1978 at the LOGC. Members of the JWG discussed lead acid battery usage data and explored various maintenance concepts. The T&E Directorate identified the MOS associated with lead acid battery maintenance and the courses being taught at the various Army schools. T&E also solicited responses from the various schools.49

Training Programs. The associated schools attempted to keep training programs current with the ever changing regulatory and doctrinal concepts that are an integral part of the science of logistics management. These two years have been no exception; however, it became increasingly clear that the requirements of the Instructional System Development Model, Soldier's and Commander's Manuals and Skill Qualifications Test added to the administrative lead time required to introduce any new regulatory or doctrinal concept into a course of instruction. This lead time and the fact that instruction is driven by what a soldier will be tested on in an SQT were key problems surfaced during this period. Although closer coordination has developed in the logistics community, continuing effort under this project required that logistics instruction keep step with current logistics doctrine.

Close coordination with the concept and doctrine community sought out areas which have training implications in the immediate future. The development leadtime for introducing new or revised instructional material into our associated schools gained wider appreciation. This leadtime, which can extend out to 18 months in the worst case, required that the schools be kept informed of doctrinal developments and included in the process at the earliest possible date.

Training Assistance to USAR Schools. In October 1976, the Training and Education Directorate embarked on a program to improve the logistics readiness status of US Army Reserve units by providing training assistance to USAR schools.[50]

This project began with a review of the programs of instruction of USAR schools to determine the doctrinal accuracy and lesson content of the schools. The second major effort was to determine the adequacy of training support rendered by the Center's four logistics associated schools. Representatives of the T&E Directorate established coordination with the three Army headquarters, the readiness regions, and the

ARCOM to schedule assistance visits to a representative number of USAR schools. Under this program, visits were made to 22 USAR schools throughout CONUS.

During the second half of FY 78, the LOGC finalized plans for rendering support to USAR schools and Reserve Component training and conducted assistance visits to 21 USAR schools and Reserve units.

During this same period, the Center worked in close coordination with the Army Training Support Center and the four LOGC associated schools in developing self-paced instructional materials for use in USAR schools.

Nine self-paced courses were pilot-tested in 24 USAR schools. The pilot test program indicated these materials can be used with little or no modification in the USAR school training environment; thus, time-consuming and expensive special course development will be saved. The nine courses proved successful; all will be totally implemented throughout the USAR school system during school year 1978-1979. All TRADOC schools' self-paced courses were scheduled to be taught in the self-paced mode in USAR schools by 1980.

Service school course developers and TRADOC USAR schools' division staff members were tasked to visit pilot test instructional sites in the evaluation process. To date test results were extremely positive and plans were underway to fully implement 22 courses in all teaching locations this coming school year. At this point, the concept of self-paced learning in the Reserve Component training environment was considered validated.[51]

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CHAPTER 8

UNIT TRAINING

Under the general theme of training support, much work occurred during this period in improving the technical expertise of the individual soldier and the proficiency of his unit. Continuing a policy begun in 1973, the Logistics Center made significant contributions to the training readiness of both active and Reserve Component logistics units.

Army Training and Evaluation Program (ARTEP). In support of the unit commander's needs as a training manager, TRADOC developed and DA approved the Army Training and Evaluation Program. The ARTEP constituted the first major change in Army unit training strategy since World War II and replaced the Army Training Test, the Army Training Program, and the Operational Readiness Test.

A device for measurement and management of the readiness and training of Active Army and Reserve Component units, the ARTEP specified the conditions, tasks, and standards for determining acceptable unit performance. Composed of separate training and evaluation outlines for individual subelements of the unit, the ARTEP identified those critical tasks that a unit must do to accomplish its combat mission. In addition, it provided the unit commander with guidance on "How To" train his unit to perform its TOE mission, and "How To" evaluate the effectiveness of this training. The ARTEP emphasized TOE mission performance rather than the extent to which elaborate or detailed procedures are followed.

With ARTEP as its number one collective training priority, LOGC functioned as the manager of ARTEP development for logistics units. Under the management direction of the Center, its four associated schools (Quartermaster, Transportation, Ordnance, and Missile and Munitions) insured that their ARTEP designers produced realistic and valid documents.

ARTEP required formal evaluations every 18 months for Active Army units and every 3 years for Reserve Component units. Whenever possible, a headquarters two echelons above the unit conducted the formal evaluations. Unit commanders and appropriate major commands received reports of formal evaluations. The commander then developed a training program designed to correct the training deficiencies noted in the formal evaluation. Periodic internal evaluations were utilized to determine the units progress and revise the training as necessary. In effect, this utilized the ARTEP as a diagnostic tool to determine training effectiveness.

The ARTEP continued to be well received by units in the field as the basis of the collective training program. By early calendar year 1977, 39 logistics ARTEP were completed and in the hands of using units. Over 90 percent of the combat and combat support ARTEP and a majority of those for combat service support units were in draft or final print. During the last half of FY 77, based on lessons learned in the second generation of ARTEP, new ARTEP guidance was written and staffed. The guidance stressed combined arms integration into all ARTEP publications and a closer relationship between the individual and collective training programs.[1]

The logistics portion of the ARTEP program underwent significant changes. By consolidating ARTEP for units with similar organizational structure and/or missions, the LOGC associated schools reduced substantially the overall number of documents in the program with no degradation in unit coverage.[2]

As of 30 September 1978, there were 96 logistics ARTEP documents scheduled for production. This figure excluded those draft documents that evolved to support the Restructured General Support and Restructured Division Tests. Despite the validity of these documents, further developmental actions remained in abeyance pending the outcome of the tests.

Currently 77 logistics ARTEP have been fielded (exclusive of RGS and DRS) and made available for use by units in the field. This equated to ARTEP coverage for 1659 (95 percent) of the 1752 logistics units presently in the force structure.

The LOGC held several workshops during this period with ARTEP action officers from the associated schools and TRADOC to discuss problem areas, resolve shortfalls, and identify areas for future improvement in the program. In addition, the Center hosted a conference with active and Reserve Component DISCOM commanders to allow them to present their actual experience in training and evaluations using the ARTEP.[3]

Based on experience gained and the limited feedback received from the field containing substantive criticism of the logistics draft ARTEP, the LOGC recommended the elimination of the test edition and the concurrent worldwide distribution of the draft edition for use as a training and evaluation document. As a result of HQ TRADOC and FORSCOM approval, using units now receive useable ARTEP 8 to 10 months earlier than originally programed.

A draft revision of TRADOC Regulation 310-2, Preparation of Army Training and Evaluation Program, was received for staffing. The revised

regulation results in an improved, more useable tool. Effective 3 April 1978, the staff responsibility for the management of the ARTEP program shifted from HQ TRADOC to the US Army Training Board, Fort Eustis, Virginia.[4]

ARTEP provided, in one document, the critical tasks that a unit must be able to accomplish, and the conditions and standards governing their accomplishment. In this project, the Logistics Center attempted to provide the unit commander the best available training tool. The ARTEP was not a cure all but a major step forward in the performance-oriented approach to training.

Training Extension Course (TEC). A second, major part of the Logistics Center's training support responsibility involved actions to assist the individual soldier. The Training Extension Course, or TEC, program made considerable progress since its inception in 1972. Designed to assist the field commander in improving MOS proficiency within his unit, TEC provided exportable MOS prepackaged training support.

Each MOS or job selected for a TEC lesson development underwent an extensive engineering effort to determine the critical tasks which the lesson should train. The TEC lesson employed the latest state-of-the-art design techniques to include diagnostic testing, self-pacing, behavioral objectives, interactive design, and try out revision cycles. Prior to fielding, soldiers applicable MOS or jobs validated each TEC lesson. TEC required hands-on performance.

During this period, a major effort involved the coordination of TEC lesson nominations from the four associated schools. Covering the FY 79 and FY 80 programs, LOGC staffed and reviewed these lessons in detail to insure compatibility with the Enlisted Personnel Management System and those critical tasks contained in the Soldier's Manuals. At the conclusion of the period, the 4 LOGC associated schools developed 206 TEC lessons, and reproduced and distributed 164 of them to the field.

Doctrinal changes and contractual problems prevented the TEC program from reaching the level of production originally anticipated. These problems, emphasized by a letter from the LOGC Commander to the Commander, Army Training Support Center (ATSC), resulted in contractual and procedural changes designed to compress the development and reproduction cycles. More effective coordination procedures resulted which provided for early notification of doctrinal changes.[5]

RC Logistics Trainers Conference. After the success of the first RC Logistics Trainers Conference held in October 1976, the Unit Training

Directorate hosted a second conference on 27 through 29 September 1977. Ninety logisticians and trainers from 30 major headquarters, staff agencies, and schools throughout the United States attended.

The primary conferees were the key active Army logistics coordinators and training managers of the Continental United States Armies and Army Readiness Regions associated with RC training. Major General W. Stanford Smith, Military Executive, Reserve Forces Policy Board, Office of the Secretary of Defense, and Brigadier General Howard G. Crowell, Jr., Assistant Deputy Chief of Staff for Training, US Army Training and Doctrine Command, delivered the guest lectures.

The conference informed the conferees of the latest developments concerning new and emerging doctrine, organization, and training changes within the TRADOC logistics community; provided a forum for the discussion of RC logistics training problems and solutions/alternatives; and identified logistics training requirements for appropriate action.

The 3-day conference occasioned 23 presentations on training-related subjects and addressed over 14 training problems in open discussion. The conference was divided into two phases. The first phase consisted of informational briefings by the LOGC, US Army Training Support Center (USATSC), US Army Command and General Staff College (USACGSC), US Army Materiel Development and Readiness Command, US Army Troop Support Agency (USATSA), US Army Training Board, US Army Transportation Center (USATCFE), and the four associated logistics schools: US Army Quartermaster School, US Army Ordnance and Chemical Center & School, US Army Missile and Munitions Center & School, and US Army Transportation School. Basically, informational presentations covered existing and planned programs designed to support the training of personnel in units on an individual and collective basis. The availability of nonresident and exportable training devices/packages was the main theme of presentations given by the schools. The LOGC briefings addressed evolving logistics systems, to include changes in doctrine and organizations, expected to affect RC logistics training during the next two years. The second phase consisted of an open discussion which addressed the training problems identified by the CONUSA and ARR representatives.[6]

As a complement to and in support of the RC Logistics Trainers Conference, an RC Maintenance and Chemical Trainers Conference took place at the USAOCCS, 21 through 24 March 1978. The conference established a closer interface between the USAOCCS and the maintenance/chemical coordinators at the Army Readiness Regions/Groups as well as other agencies involved in RC training. It also updated attendees on doctrinal and training developments in the maintenance/chemical areas; and it further addressed specific problems identified by attendees.[7]

Division Logistics (DIVLOG) and Logistics Modules (LOGMOD). The Logistics Training Board (LTB) assumed the responsibility for coordinating the development of DIVLOG/LOGMOD on 22 July 1977. This project involved the development of division level games to train key DISCOM personnel, and the adaption of LOGMOD kits as developed for combat arms battalions to train LOGC proponent battalion S4 in internal logistics functions.

On 5 August 1977, the LOGC tasked the associated schools to develop prototype DIVLOG modules by 1 October 1977 and to prepare a milestone schedule for the development of LOGMOD. The LTB conducted a workshop on 30 and 31 August, reviewed DIVLOG progress, established product uniformity, and insured that each module interfaced with other modules as necessary. The Combined Arms and General Staff College hosted a second workshop at Fort Leavenworth, Kansas, on 27 through 29 September, during which final corrections were made and six sets of each prototype module turned over to the Combined Arms Training Development Activity.[8]

The 24th Infantry Division tested these modules at Fort Stewart, Georgia, 9 through 11 December 1977. The LOGC hosted a DIVLOGMOD coordination meeting on 7 February 1978. This meeting reviewed DIVLOGMOD packet modifications deemed necessary as a result of the 24th Infantry Division test and discussed future validation plans. Desired modifications were completed and forwarded to CATRADA for review on 31 March 1978. Upon completion, the packets went to TRADOC Systems Analysis Activity for a final, six-month validation.

After reevaluating the need for continued development of LOGMOD, the LOGC recommended to the Combined Arms Center that the tasking to develop LOGMOD be rescinded and that LOGMOD development be continued as determined by the LOGC and its assigned schools. The Transportation School completed and forwarded its final draft LOGMOD to the LOGC on 25 September 1978. After review by this Center, the LOGMOD will be forwarded to CATRADA for review and validation. Development of LOGMOD by the US Army Ordnance and Chemical Center and School continued while action on this project was shelved by the US Army Quartermaster School and US Army Missile and Munitions Center & School.[9]

Wiesbaden Logistics Training Support (Brigade 76). On 9 July 1976, the US Army Combat Arms Training Board tasked the Logistics Training Board to develop a training assistance program for Brigade 76 located in Wiesbaden, Germany. LTB determined that the program should be a coordinated logistics community effort to provide a performance oriented total training system which addressed both individual and unit training requirements.

In coordinating with the Logistics Center associated schools, the Logistics Center established and accomplished three major goals. First, in December 1976, it compiled and forwarded to the brigade a complete logistics MOS reference library in December 1976. The library included critical task lists, soldier's manuals, correspondence courses, and TEC lessons to support each logistics MOS in the brigade. Utilizing this material and supporting hardware such as the Beseler Cue/See and Sony Rover TV system, the support battalion established the brigade's first learning center in December 1976. Secondly, in February 1977, it developed and forwarded to the support battalion a logistics-oriented CPX to provide command and staff training. Finally, it completed 17 self-paced exportable MOS courses and forwarded them to the brigade incrementally. The Center mailed the last course in May 1978.

The Logistics Center sent a letter to the US Army Training Board, formerly CATB, on 3 February 1978, stating that they completed the initial tasking and no further action on this program would be initiated unless they received new tasking.[10]

Exportable Training for Logistics Units/MOS. As an adjunct to the Brigade 76 program, LTB initiated a project to develop exportable training packages for other logistics units and MOS. As a result of this action, the US Army Training Support Center included seven logistics MOS self-paced exportable courses in the USAR School System Pilot Program. Additionally, LOGC developed a traveling salesman type presentation to show units and USAR schools what individual and unit training is available.

Logically, those who must fight first, should be trained first. Consequently, the LOGC initiated a study of logistics mobilization requirements in support of OPLAN 4102 in order to assure that the production of training material and other training assistance efforts support the early deploying logistics force.[11]

Improved Training Support for Early Deploying Logistics Units. The Center established this project in February 1977, to evaluate current active and Reserve Component logistics unit deployment mobilization requirements. As stated in its objectives, the project hoped to identify current active and Reserve Component logistics unit deployment mobilization requirements; established specific areas of emphasis to guide overall logistics community training development and assistance efforts; and assured production of training material and other training assistance efforts to support the early deploying logistics force.

Preliminary analysis in the formulation of the project concept revealed that total training assistance efforts were not fully supporting mobilization requirements and that the expenditure of training support resources must be afforded precedence. The project addressed the identification of training requirements and training support for 42 critical MOS and 68 type TOE, encompassing both active and Reserve Component logistics units. An analysis of key factors, MOS and TOE unit population, unit and MOS readiness levels, and current training programs identified a number of training support shortfalls in the areas of Army Training and Evaluation Programs, Soldiers Manuals, Training Extension Courses, Skill Qualification Tests, exportable training materials, resident instruction, correspondence courses, and other type training support for the critical MOS/TOE surveyed.

The project established critical TOE, MOS and logistics unit lists, and measured unit and MOS readiness for Reserve Component units. Using these critical lists, LOGC personnel visited the 90+ USAR schools and provided them with copies as a guide to establishing training priorities. The Center also established a good working relationship with the CAA and received input from their readiness indicator model pertaining to D to D+60 logistics units. The measurement of unit and MOS readiness posture required coordination with FORSCOM and DA DCSOPS to arrange for special Reserve Component Force Status printouts to match D+60 units by required delivery date and logistics branch.

In May 1977, the LOGC commander forwarded letters to the FORSCOM and TRADOC commanders outlining the project and planned LOGC actions, and he solicited comments and recommendations on suggested applications. Major General Robert Haldane, FORSCOM, responded with a favorable indorsement; however, the transfer of command and other circumstances existing at the time precluded a TRADOC reply. Since then, Major General John W. Siegle, the Deputy Chief of Staff for Training, HQ TRADOC, and his staff were apprised of the project.

In July and August 1977, the LOGC provided the logistics associated schools the critical MOS, TOE, and unit lists as a guide to establishing priorities in training development activities. The Center further directed priority effort to these areas in all aspects of training development. To develop a total picture of logistics unit training requirements, the project looked at a worldwide analysis of deployed and nondeploying units, and nonassociated school logistics MOS such as signal, medical, and engineer.

During FY 78, the LOGC determined the need to identify the location of all active and Reserve Component logistics units. By combining the

Worldwide Military Command and Control System with the DOD Activity Address Code system, the Center developed a single automated listing. By adding LOGC proponent school ARTEP responsibility to the report, a total force listing and an ARTEP distribution system was created. The LOGC provided this data base to the four associated schools during an In-Process Review on 19 January 1978. The IPR also resulted in the tasking of the four associated schools to determine the validity of the project objectives and whether the schools should conduct an in-house review of their critical MOS and identify training shortfalls by 1 May 1978, with a final report to be submitted by September 1978. The schools' responses did not fully support the study objectives and a new thrust was planned for this project.

The Center furnished MOS/TOE listings, total force listing, and ARTEP distribution listings to the four associated schools, the US Army Training Board, the Training Support Center, and the Troop Support Agency. The USATB investigated the possibility of extending the logistics total force listing to include a total Army Force listing.

One final action in the study effort concerned the establishment of a system to insure user awareness of available training support material. The Center requested the US Army Training Support Center consider the distribution of training support information, using information provided by the schools in the Enlisted Personnel Management System (EPMS) MOS Master Training Plan. The USATSC developed a user manual to explain the use of data available from the logistics unit information data base.[12]

Petroleum Glass Pipeline Training Aid. In FY 76, the LTB determined the need for and arranged development of such an exportable training aid for use by Petroleum Operating Companies in training of personnel in military occupational specialties 76W, 92C, and 4960. These are difficult to train MOS, particularly in Reserve Component units, since they don't have a peacetime operational mission, nor do they have actual pipeline equipment available for use. Following development of a prototype model of the device, the US Army Quartermaster School took over the project for further testing and validation prior to construction of additional models and export to field units. Critical tasks from the Army Training and Evaluation Program and Skill Qualification Tests were incorporated into the companion scenario to provide realistic training and evaluation in pipeline management and operations for individuals and units organized under TOE 10-202, 10-206, and 10-207. The device was distributed to five RC and one active component petroleum units.[13]

Training Exercises

LOGEX is an annual, national combat/combat support/combat service support corps level command post exercise sponsored by DA and listed on the JCS coordinated 5-year exercise program. The Deputy Chief of Staff for Logistics is the DA staff proponent for LOGEX. With the LOGC as the executive agent, TRADOC designed, prepared, and conducted the exercise. US Army Forces Command selects and coordinates unit participation in the exercise.[14]

LOGEX 76. Printing and distribution of the TRADOC approved LOGEX 76 After Action Report was completed by the first week of November 1976, and distributed to over 125 headquarters, commands, and agencies worldwide.[15]

LOGEX 77. Exercise LOGEX 77 took place at Fort Pickett, Virginia, from 12 to 25 June 1977. It was the 30th in a continuing series of annual LOGEX exercises and included active Army and Reserve Component participation. Active Army units participating in the exercise involved HQ, XVIII Airborne Corps, elements of the 24th Infantry Division, and a number of combat support and combat service support units. Major Reserve Components units included elements of the 40th Infantry Division (Mechanized), 49th Armored Division, and 416th Engineer Command.

The exercise trained participants in combat support and combat service support command and staff procedures emphasizing interdependence among the military services operating as an armed forces team. It stressed the interface between combat support and combat service support organizations, activities, and functions and stressed the importance of command and staff procedures. Finally, the exercise presented current combat support and combat service support doctrines and introduced, within exercise capability, new and emerging concepts.

A total of 2,297 personnel from 20 active Army, 23 Army National Guard, and 26 Army Reserve units, several service schools, and the Navy and Air Force participated in the exercise. These divided into 1,651 players supported by 271 controllers and reactors, 291 administrative and site support personnel, and 84 members of other services.

LOGEX 77 was the final in a 3-year series of exercises set in the Korean locale. The scenario for LOGEX 77 again portrayed a political-military situation in the Republic of Korea in 1985 requiring armed assistance from the US under provisions of a hypothetical Mutual Defense Treaty. Korea requested US forces to assist them in the defense of their Line-of-Communication while they completed mobilization and

preparation for offensive operations to restore their borders. The active Army, National Guard, and Army Reserve units played the 94 manned headquarters. Individual Ready Reserve personnel played the chaplain and chemical detachments. Staff, faculty, and selected students of the proponent schools manned seven Restructured General Support centers.

Divisional Materiel Management Centers were played for the first time. Each of the three participating divisions enjoyed the unique opportunity for their organic division center to actually train with a corps Materiel Management Center. The exercise gave the Army Reserve unit that played the corps headquarters its first opportunity to train simultaneously with three different division headquarters. The Criminal Investigation Command (CIC) also participated for the first time in LOGEX 77, providing player units and controller personnel. The exercise included the first application of the emerging RGS concept in a major CPX.

As a vehicle for training combat support and combat service support units, LOGEX 77 accomplished its objectives and provided a meaningful training experience. The exercise integrated effectively the discipline of selected combat support and all combat service support functions to include joint service interface in a single exercise.[16]

LOGEX 78. Exercise LOGEX 78 took place at Fort Pickett, Virginia, from 12 through 25 August 1978. Like LOGEX 77, LOGEX 78 was a JCS-sponsored, large-scale command post exercise conducted by the Logistics Center. Unlike the previous exercise, LOGEX 78 was the first in a 3-year cycle centering upon a corps operation in the Federal Republic of Germany, under the North Atlantic Treaty Organization structure. The first in a new series of exercises utilizing the European scenario portraying a US corps and a Marine Amphibious Force as part of the NATO force, the joint exercise involved participants from all services, HQ NORTHAG, the German Army, and USAREUR and brought together participants from 34 states and Puerto Rico. It included 5 active Army, 37 Army National Guard, and 40 US Army Reserve units selected by FORSCOM. The other US services included representatives from the Tactical Air Command, Military Airlift Command, Military Sealift Command, and the US Marine Corps Reserve. A total of 2,838 personnel were involved.[17]

In addition to exercise play, participants attended professional development training classes. Representatives of participating schools, centers, and agencies presented 44 hours of instruction, covering 39 separate subjects. The Exercise Director's Final Report went to TRADOC for review and signature on 31 October 1978.

Anticipating next year's exercise, General Smith wrote General Starry that, "using the critiques and comments from this year's exercise, we are developing LOGEX 79 with a more realistic corps area in the NATO structure. Utilizing improved ADP systems, we expect to integrate more tactical considerations into the exercise. It is anticipated," Smith concluded, "that LOGEX 79 will include the same joint service and NATO community representatives."[18]

LOGEX-Local. A major by-product of the national exercise, LOGEX-Local were individual unit CPX training packets developed from the national exercise material and mailed to active and reserve units for their use at home stations. Preparation for several different type unit packets got underway immediately following LOGEX 77. TRADOC and FORSCOM training literature advertised availability of these packets, and mailing commenced in response to individual unit requests. Distribution exceeded 1,000 packets. In addition to individual unit use, the maneuver area commands and maneuver training commands used material from these packets to assist them in developing FTX and CPX programs for a variety of support units. The material permitted a unit to train itself and/or subordinate units on its TOE mission via the CPX or FTX mode.[19]

LOGEX-Local 76. The LOGEX-Local 76 program consisted of exportable training packets specially adapted from the national LOGEX exercise materials. Each packet used recovered exercise materials--publications, maps, overlays, etc., and was supplemented by additional data developed to provide a realistic training vehicle for a specific type unit. Twenty-nine different type TOE packets were mailed to units on 1 November 1976. In addition to the 523 requests for unit distribution received from HQ FORSCOM, 324 requests were received between December 1976 and April 1977 from individual units. LOGEX-Local packets improved over previous years by the addition of comprehensive user instructions and more intensive organization of situation play.[20]

LOGEX-Local 77. Based upon an independent corps contingency operation in the Republic of Korea, LOGEX-Local 77 involved 384 packages, covering 29 type TOE units.[21]

LOGEX-Local 78. LOGEX-Local 78 was based upon a corps operation in the FRG, under the NATO structure. Preparation of 26 type TOE packages began on 4 September 1978. The US Army Training Support Center, Fort Eustis, Virginia, was requested to advertise the availability of LOGEX-Local packages. The change to a European location is expected to create a demand for approximately 1,200 packages. Mailing began during December 1978.[22]

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CHAPTER 9

THE YEARS IN RETROSPECT

This period marked completion of the LOGC's fifth year of responsibility for improving combat and combat service support for the Army in the field. Coinciding with the anniversary was the first change of command. On 28 July 1977, Major General Erwin M. Graham, Jr., retired from the Army, and Major General Homer D. Smith, Jr., assumed his offices.

Several noteworthy developments transpired in training during these years. The LOGC Master Mechanic concept underwent considerable scrutiny by several Army schools. The LOGC prepared a 4-phase Pre-Command Course development plan. It also amended the Logistics Baseline Curricula supply portion and executed it at the service schools in both officer basic and advanced courses. In all cases, the Center published performance-oriented training objectives and furnished manuscript lesson plans to decrease training demands at the nonlogistics service schools.

In unit training, LOGEX stood out as a major LOGC contribution to the training of combat support and combat service support personnel. LOGEX 78 incorporated a European scenario with a US corps and a Marine amphibious force. As a result, LOGEX 79 will embody a more realistic corps area in the NATO structure.

The Army Training and Evaluation Program advanced significantly within the logistics community, increasing its coverage to 96 percent in October 1978. "By consolidating ARTEPs for units with similar missions and/or like organizational structures," wrote General Smith in his annual report to TRADOC, "the LOGC and its associated schools substantially reduced the overall number of ARTEP documents in the production schedule without sacrificing unit coverage."[1] Training Extension Course development proceeded apace, having produced 128 TEC lessons since August 1977.

The LOGC showed some concern during these years in the materiel developments area. Especially disconcerting was "the initial lack of interest in supportability for some of emerging weapons systems," which "resulted in cost overruns, unnecessary delays, and unforeseen changes in design and organizational structure."[2] A prime example was the ROLAND interoperability missile project.

Dependence on high RAM characteristics and impressible automated tests support equipment induced the PATRIOT Project Manager to recommend

the abrogation of all GS and depot maintenance. The LOGC and the Missile and Munitions School actively worked on PATRIOT development and testing to insure the systems supportability under MEP and to provide an alternative support concept should MEP prove unsuccessful.

The Center inspired an Army-run formal physical teardown and maintenance evaluation which exposed various maintenance problems and brought them to the attention of the XM-1 Project Manager.

LOGC established the Commercial Heavy Vehicle Transporter program, and plotted the fielding of the M-911 vehicle. In the area of Automated Test Support Systems, the Center, together with TRADOC and DARCOM, endeavored to formalize the program with a clear division of tasks and responsibilities. The LOGC played another major part with TRADOC and DARCOM (as well as OTEA) in extending operational mission failure criteria and assessment procedures. Additionally, the Center participated in assessing the V Corps CSS system's ability to sustain the combat force in the main battle.

In March 1978, logistics participation was attempted for the first time during war gaming, as the LOGC and its associated schools prepared a methodology for logistics participation in the war gaming of the Europe Short Warning Scenario.

The Center moved forward to guarantee that user testing and evaluation adequately addressed RAM and logistics supportability. Unfortunately, the Center proved unsuccessful in the actual materiel systems user tests. The Center persisted in its efforts, however, to monitor the test and evaluation process for each system.

During these years, the LOGC concluded the appraisal and analysis phase of the Restructured General Support study, and in August 1978, distributed a draft final report. "The report indicates that the RGS concept will doctrinally save personnel and equipment, increase operational availability, and hold unit conversion turbulence within the reserve components to an acceptable level," reported General Smith.[3] During 1978, DA ODCSLOG indorsed the Authorized Stockage List Mobility Study final report.

The Center initiated the How-To-Support literature program during this 2-year interval. As a first step in the HTS program, the Center published TC 100-10, Combat Service Support in Battalion, as a guide for TRADOC schools and centers in preparing future HTS publications and including these concepts in the instructional programs and ARTEP documentation. The LOGC encouraged the Quartermaster School to develop three HTS films to complement the HTS manuals.

"Our initial efforts in drafting the logistics portion of FM 100-16, Echelons Above Corps, coupled with a continuing dialogue and resolution of the concepts in the Phase II study," wrote the LOGC Commander, "set the stage for the Center to develop and implement the doctrine and structures required to provide coherent and integrated support in future iterations of Division 86." By cooperating with DA ODCSLOG in the development of these concepts, "we believe that they are currently structured to permit maximum flexibility in their implementation."[4] At TRADOC direction, the Center organized a Reserve Component Advisory Group in 1978 to critique doctrinal and force structure studies/suggested workings and to offer inciteful arguments regarding their effect upon reserve component units.

During these years the LOGC championed the proposal to "roundout" active duty corps support commands. "To breathe life into this effort," the Center conducted a general officer workshop on "COSCOM Roundout" in June 1978.[5]

In April 1978, a Munitions System Support Structure study defined the theoretical foundation to maintain ammunition supply in the rising logistics system (less chemical special ammunition and NATO nuclear special ammunition support) and new tactical doctrine for the 1976-1980 timeframe. This LOGC-directed study offered the first look since 1965 at the munitions support structure from a systems standpoint and opened the way for an extended study effort to ascertain the ability of the MS3 framework to uphold support developments during the period 1981-1989. The LOGC is refining the MS3 structures to support the total force structure and the Army ammunition plan.

Between June and November 1978, the LOGC "chaired two joint working group meetings to develop concepts and recommendations for the improvement of lead-acid battery maintenance in the field as well as for a decreased consumption of these batteries."[6] During September 1978, the LOGC also hosted a JWG gathering which undertook to study a nickel-cadmium battery maintenance concept. This group gathered data pertinent to NICAD battery charging station requirements for armored, infantry, mechanized infantry, and airborne/air assault divisions.

During this period, the Center concerned itself with the construction and utilization of the heavy equipment transporter. In August 1978, LOGC sent TRADOC the final draft study which, "recommends that the number of currently authorized HETs be increased by approximately 40 percent through 1983 and that a new or modified semitrailer be acquired so that two of the fighting vehicles now under development can be transported in one lift."[7]

The Center's involvement with automation of logistics management and information systems ripened in concert with similar efforts in DA, the Computer Systems Command, and CACDA. "Our major thrusts," argued General Smith, "continued to be to insure a quality product, to thoroughly involve the user, to eliminate punch cards, to develop wartime applications, manage modifications, and to pursue our efforts within the context of an integrated battlefield architecture encompassing communications."[8] The Center fielded the Standard Army Intermediate Level Systems Army-wide during 1978, extended SAILS AB throughout CONUS and in two USAREUR corps, and established SAILS ABX at all other overseas locations.

In July 1978, the LOGC amended the Direct Support Unit Standard Supply System Detailed Functional System Requirement to include DS4 divisional requests. That same month, the Quartermaster School finished the functional user manuals. Subsequently, in September, the Center developed a detailed functional training package and supplied MACOM and Army Training Base cadre formal training. From July 1977 through December 1978, the LOGC furnished practical direction to the Computer Systems Command in the by-process testing of the system.

The Center perfected the Standard Army Ammunition System "to provide a standardized class V management and reporting capability from the theater army level down to the ammunition supply point."[9] The Center developed SAAS Level 3 and 4 systems to furnish the COSCOM and subordinate elements with class V stock status documentation.

In Europe, the LOGC assisted in the evolution of the Visibility of Intransit Cargo module of DAMMS. Upon establishment of a new system change package, the Center implemented about 700 Standard Port System changes. The Army proclaimed SPS a standard multicommand system in November 1974. The LOGC chaired the system development group charged with the responsibility of completing the upgrade action by extending the DASPS-E to the 4th Qtr, FY 82.

The LOGC was involved in the Improved Manpower Authorization Criteria Procedures project which impressed itself heavily on TOEs throughout the Army. As the agency responsible for implementing the Army Materiel Systems Analysis Agency's MACRIT concept, the Center staffed a draft project directive through TRADOC to DA. The MACRIT necessitates additional personnel "which are not presently available" and additional funds and resources. Two years are needed to complete the project.[10]

In his Annual Report to TRADOC, the LOGC Commander observed that, "The conduct of economic analyses and burden assessments in support of the development of US Army standard logistics systems is a continuing

major mission requirement."[11] During CY 78, the Center completed three economic analyses, two burden assessments, and a quick response cost analysis.

While General Smith lauded the LOGC for significantly improving its modeling and simulation capabilities and its support to the schools and centers during 1978, he also acknowledged that "we remain considerably short of where we should be." Using the TRADOC Master Plan for models and supporting data bases, "we have developed several new simulation models which represent logistics support realistically and are major elements in new and more objective methodologies to speed up and enhance the validity and credibility of our programs and studies."[12] The LOGATAK I simulation model analyzed logistics distribution systems (supplies and materiel) and evaluated interdiction on lines of communication and supply points.

The Tactical Wheeled Vehicle Fleet Simulation models successful export to the Transportation School represented yet another significant event during these 2 years in technical support. In 1978, when the LOGC received JIFFY and DIVWAG results over the TRADOC teleprocessing network, it was "the first step in bringing CAC and the LOGC into a close, dynamic relationship for force structuring and force analysis."[13]

During this period, several events occurred which dramatically altered the analytical future of the LOGC. The first of these milestones was the evolution of the Logistics Planning Factors Management Division of the Operations Analysis Directorate. The second event concerned improvements to the logistics MACRIT and TOE development processes. The LOGC suggested a methodology to overcome many of the past imperfections. Thirdly, in March 1978, the Center acquired the FASTALS force roundout model which provided a common vehicle or context for the development of MACRIT/TOE and analysis of force trade-off and structuring issues. Finally, the Center began "a fairly extensive effort to make some of our existing models and data bases more efficient, to produce more meaningful output to functional personnel, and in selected cases to make these tools operational on interactive terminals."[14]

While the Center has a long way to go in improving technical support, General Smith believed the LOGC made "substantial progress toward an objective, responsive analytical support capability which will help insure that the activities of HQDA, DARCOM, and TRADOC constitute a coherent, credible process from MACRIT and TOE development through concepts and system development to final force structuring and materiel acquisitions."[15]

General Smith summed up this 2-year period nicely when he remarked that it was "a time of challenge, growth, and increasing acceptance by the Army community of the importance of proper logistics planning."[16] During this time, the Center strengthened that perception.

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CHAPTER 10

LIST OF ACRONYMS AND ABBREVIATIONS

AAA	Army Audit Agency
AAH	Advanced Attack Helicopter
ABCA	America, Britain, Canada, and Australia
ABF	Asset Balance File
ABIC	Army Battlefield Interface Concept
ACLSVF	Armored Combat Logistics Support Vehicle Family
AC2MP	Army Command and Control Master Plan
ACR	Armored Cavalry Regiment
ACSS	Augmented Contact Shop Set
ADAM	Artillery Delivered Anti-Personnel Mine
ADMINCEN	US Army Administration Center
ADPE	Automatic Data Processing Equipment
AFARV	Armored Forward Ammunition Resupply Vehicle
A&FC	Airworthiness and Flight Characteristics
AFPDA	Army Force Planning Data and Assumption
AHAMS	Advanced Heavy Antiarmor Missile System
AHAWS	Advanced Heavy Antiarmor Weapon System
AIM	Armored, Infantry, Mechanized
AIT	Advance Individual Training
ALMC	US Army Logistics Management Center
ALOC	Air-Line of Communication

ALPC	Army Logistics Planning Council
ALSC	Army Logistics Specialty Committee
AMFD	Army Master Data File
AMIS	Army Management Information System
AMME	Automated Multi-Media Exchange
AMSAA	US Army Materiel Systems Analysis Activity
AOAP	Army Oil Analysis Program
APG	Aberdeen Proving Ground
APOE	Aerial Port of Embarkation
ARCSA	Aviation Requirements for the Combat Structure of the Army
ARMS	Aircraft Reliability and Maintainability Simulation
ARRCOM	Armaments Readiness Command
ARTADS	Army Tactical Data Systems
ARTEP	Army Training and Evaluation Program
ASI	Additional Skills Identifier
ASL	Authorized Stockage List
ASP	Ammunition Supply Point
ATB	US Army Training Board
ATDL	Army Tactical Data Link
ATE	Automatic Test Equipment
ATEM	Automatic Test Equipment Missile
ATLP	Armywide Training Literature Program
ATP	Ammunition Transfer Point

ATP	Army Training Program
ATP	Allied Tactical Publication
ATSC	Army Training Support Center
ATSS	Automated Test Support System
ATT	Army Training Test
ARNG	Army National Guard
ARR	Army Readiness Regions
BA	Blasting Agent
BAMD	Battlefield Automation Division
BAMO	Battlefield Automation Management Office
BAMP	Battlefield Automation Management Program
BAS	Battlefield Automated System
BASOPS	Base Operating System
BCS	Battery Computer System
BDP	Battlefield Development Plan
BIT	Battlefield Interoperability Terminal
BOIP	Basis of Issue Plan
CAA	Concepts Analysis Agency
CAC	US Army Combined Arms Center
CAPS	Consolidated Aerial Port System
CAR	Corps Automation Requirements
CARBIT	Corps Automation Requirements Baseline Identification Test
CATB	Combat Arms Training Board

CATRADA	Combined Arms Training Development Activity
CCSS	Commodity Command Standard System
CD	Combat Development
C&D	Concepts and Doctrine Directorate
CDS	Capability Design Specifications
CDS	Container Distribution System
CELOGS	Combat Effectiveness with Logistics Support
CEP	Concept Evaluation Program
CEPS	Central European Pipeline System
CEWI	Combat Electronic Warfare and Intelligence
CFP	Concept Formulation Package
CFV	Cavalry Fighting Vehicle
CIBE	Command Operating Budget Estimates
CIC	Criminal Investigation Command
CMA	Container Management Application
CMF	Career Management Field
COEA	Cost and Operational Effectiveness Analysis
COGS	Combat Oriented General Support
COI	Courses of Instruction
COILS	CONUS Installation Logistics Support
COMMZ	Communications Zone
COMSR	Communications Support Requirements
CONUS	Continental United States

CONUSA	Continental United States Armies
COSCOM	Corps Support Command
COSCOM MMC	Corps Support Command Materiel Management Center
COSRRIB	Combat System Rearm/Refuel in Battalions
COSSA	Containerized Shipment and Storage of Ammunition
COVERS	Combat Vehicle RAM Simulation
CPX	Command Post Exercise
CSA	Corps Storage Area
CSA	Chief of Staff Army
CSC	Computer System Command
CSCSG	US Army Computer Systems Command Support Group
CSCSGE	US Army Computer Systems Command Support Center, Europe
CSS	Contact Support Set
CSS	Combat Service Support
CS3	Combat Support Service System
CTEA	Cost and Training Effect Analysis
CTOE	COMSR Technical Operations Element
DA	Department of the Army
DAMMH	Direct Annual Maintenance Man-Hours
DAMMS	DA Movements Management System
DARCOM	US Army Materiel Development and Readiness Command
DASPS	Department of the Army Standard Port System
DASPS-E	Department of the Army Standard Port System-Enhancement

DAS3	Decentralized Automated Service Support System
DA TMDE PIL	Department of the Army Test, Measurement, and Diagnostic Equipment Preferred Items List
DCP	Development Concept Center
DCSLOG	DA Deputy Chief of Staff for Logistics
DEVA IPR	Development Acceptance In-Process Review
DFSR	Detailed Functional System Requirements
DIO	Director of Industrial Operations
DISCOM	Division Support Command
DIVAD	Division Air Defense Gun
DIVLOG	Division Logistics
DIVS	DOD Intransit Item Visibility System
DIVWAG	Division War Games
DLA	Defense Logistics Agency
DLDED	Division Level Data Entry Device
DLOGS	Division Logistics System
DLOS	Division Logistics Organization Structure
DMMC	Division Materiel Management Center
DMTI	Digital Moving Target Indicator
DNA	Defense Nuclear Agency
DODAAC	DOD Activity Address Code
DOS	Days of Supply
DPFO	Data Processing Field Office
DPI	Data Processing Installation

DPLOA	Draft Proposed Letter of Agreement
DPROC	Draft Proposed Required Operational Capability
DRE	Division Restructuring Evaluation
DRS	Division Restructuring Study
DSA	Defense Supply Agency
DSAMTS	Direct Support Ammunition Maintenance Tool Set
DSARC	Defense System Acquisition Review Council
DS/GS	Direct Support/General Support
DSS	Direct Support System
DS4	Direct Support Unit Standard Supply System
DSU	Direct Support Unit
DX-X	Expanded Direct Exchange
EA	Economic Analysis
EAD	Echelons Above Division
EEA	Essential Elements of Analysis
EEAA	Enticement and Encirclement Anti-Armor
EIP	Economic Inventory Policy
EMTT	Expanded Mobility Tactical Wheeled Vehicle
ENS	US Army Engineer School
EOD	Explosive Ordnance Disposal
EOP	Economic Order Quantity
EPMS	Enlisted Personnel Management System
ETA	Evasive Target Simulator

E&T	Evaluation and Test Directorate
EUSA	Eighth US Army
FAA	Federal Aviation Administration
FAC	US Army Finance and Accounting Center
FACC	Ford Aerospace Communications Corporation
FADALA	Failure Detection and Location Analysis
FAMECE	Family of Military Engineer Construction Equipment
FASCAM	Family of Scatterable Mines
FASCO	Forward Area Support Coordinators
FASTALS	Force Analysis Simulation of Theater Administration and Logistics Support
FDE	Force Development and Experimentation
FDTE	Force Development Test and Experimentation
FEBA	Forward Edge of the Battle Area
FIST	Fire Support
FMEA	Failure Mode and Effects Analysis
FMS	Foreign Military Sales
FMTS	Field Maintenance Test
FOE	Follow-On Evaluation
FORSCOM	US Army Forces Command
FORSTAT	Force Status
FQQPRI	Final Qualitative and Quantitative Personnel Requirements Information
FS&T	Force Structure and Test Directorate
FVS	Fighting Vehicle System

FVT	Field Validation Test
FYPP	Five-Year Program Plan
GEMSS	Ground Emplaced Mine Scattering System
GFE	Government Furnished Equipment
GFSR	General Functional System Requirement
GLDD	Ground Locator Laser Designator
GSA	General Services Administration
GSRS	General Support Rocket System
HET	Heavy Equipment Transporter
HMWC	High Mobility Weapons Carrier
HTS	How-To-Support
IAV	Intransit Asset Visibility
ICF	Intransit Cargo Files
ICTP	Individual-Collective Training Plan
IEP	Independent Exchange Plan
IERC	Independent Evaluation Review Committee
IFV	Infantry Fighting Vehicle
ILS	Integrated Logistics Support
ILSMT	Integrated Logistics Support Management Team
INTACS	Integrated Tactical Communications Study
IOC	Initial Operational Capability
IPD	Issue Priority Designator
IPR	In-Process Review

IPTF	Indirect Productive Time Factors
IRSI	International Rationalization, Standardization, and Interoperability
IRSIO	International Rationalization, Standardization, and Interoperability Office
IST	Incremental Systems Test
ITDT	Integrated Technical Documentation and Training
ITV	Improved TOW Vehicle
JCS	Joint Chiefs of Staff
JDT	Joint Development Team
J-LOTS	Joint Logistics Over-The-Shore
JLS	Joint Logistics Subcommittee
JLWG	Joint Logistics Work Group
JRCC	Joint ROLAND Control Committee
JRX	Joint Readiness Exercise
JSCP	Joint Strategic Capabilities Plan
LCSS	Land Combat Support System
LCSMM	Life Cycle System Management Model
LEA	US Army Logistics Evaluation Agency
LFF	Logistics Factors File
LFSA	Logistics Force Structuring Assessments
LIF	Logistics Intelligence File
LOA	Letter of Agreement
LOC	Lines of Communication
LOCAM	Logistics Cost Analysis Model

LOGC	US Army Logistics Center
LOGCAB	Logistics Center Advisory Board
LOGMOD	Logistics Modules
LOGS	Logistics Supportability
LOTS	Logistics Over The Shore
LP	Limited Procurement
LR	Letter Requirement
LSS	Launch Signature Simulator
LTB	Logistics Training Board
MAC	Military Airlift Command
MACOM	Major Command
MACRIT	Manpower Authorization Criteria
MAME	Missile and Munitions Evaluation
MAMS	Medium Antiarmor Missile System
MAP	Manpower Analysis Papers
MASC	Maintenance Supports Concepts Model
MATE	Modular Autodin Terminal Equipment
MAV	Minimum Acceptable Value
MAV	Maintenance Assistance Vehicle
MAWLOGS	US Army Worldwide Logistics System
MCC	Movements Control Center
MCP	Military Careers Program
MCS	Maintenance Control System

MCTNS	Manportable Common Thermal Night Sights
ME	Middle East
MENS	Mission-Element-Needs Statement
MEP	Maintenance Enhancement Program
MEMS	Manually-Emplaceable Mine System
MEV	Medical Evacuation Vehicle
MICLIC	Mine Clearing Line Charges
MICOM	Missile Command
MICV	Mechanized Infantry Combat Vehicle
MILSTAMP	Military Standard Transportation and Movement
MILSTRIP	Military Requisitioning and Issue Procedures
MIRCOM	US Army Missile Materiel Readiness Command
MLSRS	Multiple Rocket Launcher System
MMC	Materiel Management Center
MMCS	US Army Missile and Munitions Center and School
MN	Materiel Need
MODLOGS	Modernization of Logistics
MOE	Measure of Effectiveness
MOM	Maintenance Operations Management
MRM	Maintenance Reporting and Management
MOS	Military Occupational Specialities
MOU	Memorandum of Understanding
MPO	Major Program Objective

MRP	Materiels Returns Program
MRR	Materiel Readiness Reporting
MRG	Movements Requirements Generator
MRSA	Materiel Readiness Support Activity
MSD	Materiel Systems Directorate
MSSG	MICV Special Study Group
MST	Munitions Systems Support Structure
MTBF	Meantime Between Failures
MTD	Maintenance Task Demand
MTEL	Manning Table and Equipment List
MTMC	Military Traffic Management Command
NATO	North Atlantic Treaty Organization
NET	New Equipment Training
NICAD	Nickel-Cadmium
NMP	National Maintenance Point
NODLR	Night Observation Device Long Range
NOW	No Warning
OAD	Operations Analysis Directorate
OCC&S	US Army Ordnance and Chemical Center and School
OCR	Optical Character Reading
ODCSLOGS	Deputy Chief of Staff for Logistics
ODP	Outline Development Plan
OFT	Observed Fire Trainer

OJT	On-The-Job Training
O&O	Organization and Operations
OPMS	Officer Personnel Management System
OPP	Organization and Personnel Plan
OPS/ADMIN	Operations and Administration Directorate
OPTE	Operational Proficiency Training Equipment
ORG	Organization Directorate
ORSA	Operations Research and Systems Analysis
ORT	Operational Readiness Test
OS	Operation System
OT&E	Operational Test and Evaluation
OTEA	US Army Operational Test and Evaluation Agency
PAR	Pulse Acquisition Radar
PCB	Printed Circuit Board
PCC	Pre-Command Course
PE	Proponent's Evaluation
PET	Prototype Evaluation Test
PFM	Planning Factors Management
PFMD	Planning Factors Management Division
PFMO	Planning Factors Management Office
PIP	Product Improvement Program
PM	Project Manager
PMCS	Preventative Maintenance Checks and Services

PMDR	Provisioning Master Data Record
PME	Professional Military Education
PMP	Project Master Plan
PNVS	Pilot Night Vision System
POI	Programs of Instruction
POM	Program Objective Memorandum
POMINS	Portable Mine Neutralization System
PPSO	Army Personal Property Shipping Office
PQT	Performance Qualification Test
PQT-G	Prototype Qualification Test-Government
QMR	Qualitative Materiel Requirements
QMS	US Army Quartermaster School
QQPRI	Qualitative and Qualitative Personnel Requirements Information
QWG-LOG	Quadripartite Working Group-Logistics
RAAMS	Remote Anti-Armor Assault System
RACO	Rear Area Combat Operations
RAM	Reliability, Availability, and Maintainability
RAOC	Rear Area Operations Center
RAP	Rear Area Protection
RAS	Rear Area Security
RC	Reserve Component
RCAG	Reserve Component Advisory Group
RCMS	Reliability Centered Maintenance Strategy

RDAC	Research and Development Advisory Council
RDOM	Restructured Division Operations Manual
RETO	Review of Education and Training of Officers
RFP	Request for Proposal
RGS	Restructured General Support
RIMSTOP	Retail Inventory Management Stockage Policy
ROC	Required Operational Capability
RPF	Remote Print Facility
RPV	Remotely Piloted Vehicles
RSC	Reason for Stockage Codes
RSI	Rationalization, Standardization, and Interoperability
RSPE	Retail Stockage Policy Evaluation
SAAS	Standard Army Ammunition System
SAG	Study Advisory Group
SAILS	Standard Army Intermediate Level System
SAMS	Standard Army Maintenance System
SCH	US Army Support Command - Hawaii
SCP	Systems Change Package
SCR	Systems Change Request
SCORES	Scenario-Oriented Recurring Agency
SDD	Systems Design Directorate
SDG	Systems Development Group
SELCOM	Select Committee

SHAD-CCP	Sharp Army Depot Container Consolidation Point
SIGCEN	Signal Center
SIGINT/EW	Signal Intelligence and Electronic Warfare
SIGS	US Army Signal School
SIMS-X	Selected Items Management System-Expanded
SIT	Situation Integration Test
SKO	Sets, Kits, and Outfits
SLEEP	Family of Silent Lightweight Electronic Energy Plans
SLUFAE	Surface Launched Unit, Fuel Air Explosive
SOLE	Society of Logistics Engineers
SOM	Storage Operation Module
SOP	Standard Operating Procedures
SPA	Skill Performance Aids
SPBS	Standard Army Property Book System
SPC	Staff Planners Course
SQT	Skill Qualification Test
S&S	Supply and Services
S&T	Supply and Transport
STE/ICE PM	Simplified Test Equipment for Internal Combustion Engine Powered Material
STF	Special Task Force
STMP	Systems Training Management Plan
SW	Short Warning

TA	Theater Level
TAACOM	Theater Army Area Command
TAA 85	Total Army Analysis 85
TACFIRE	Tactical Fire Direction System
TACV	Tactical Wheeled Vehicle
TADS	Target Acquisition and the Designation System
TAMC	Tripler Army Medical Center
TAMMS	Army Maintenance Management System
TARADCOM	US Army Tank-Automotive Research and Development Command
TAS	Tracking Adjunct System
TASCOM-S	Theater Army Support Command
TAS3	Transportation Aircraft Supply Support System
TC	Type Classification
TCATA	TRADOC Combined Arms Test Activity
TCR	Test Condition Requirements
TD	Training Development
TDR	Training Device Requirements
T&E	Training and Education Directorate
TEA	Training Effectiveness Analysis
TEC	Training Extension Course
TECOM	US Army Test and Evaluation Command
TEMMS	Test and Evaluation Milestone Management System
TEMPS	Test and Evaluation Master Plans

TFTS	Tow Field Test Set
TIWGS	Test Integration Work Groups
TLR/S	Total Logistics Readiness/Sustainability
TMAE	Tank Main Armanent Evaluation
TMDE	Test Measurement Diagnostic Equipment
TNFS	Theater Nuclear Force Survivability
TOE	Tables of Organization and Equipment
TOPS	Transportation Operational Property System
TOS	Tactical Operations System
TRADOC	US Army Training and Doctrine Command
TRASANA	TRADOC Systems Analysis Activity
TROTTS	Theater Realignment of Lines-Haul Highway
TSARC	Test Schedule and Review Committee
TSCH	US Army Transportation Center and School
TSM	TRADOC System Manager
TSP	Test Support Range
TT	Turret Trainer
TTC	US Army Tropic Test Center
TTS	Tank Thermal Sight
UET	Universal Engineer Tractor
USATCFE	US Army Transportation Center
USAARMC	US Army Armor Center
USAARRCOM	US Army Armament Readiness Command

USACERCOM	US Army Communications-Electronics Materiel Readiness Command
USACGSC	US Army Command and General Staff College
USAEARA	US Army Equipment Authorization Review Activity
USAES	US Army Engineer School
USAFAS	US Army Field Artillery School
US/FRG	United States/Federal Republic of Germany
USAICS	US Army Intelligence Center and School
US AMMCS	US Army Missile and Munitions Center and School
USAMPS	US Army Military Police School
USAOCCS	US Army Ordnance and Chemical Center and School
USAQMS	US Army Quartermaster School
USAREUR	US Army Europe
USARJ	US Army Japan
USARPAC	US Army Pacific
USASCH	US Army Support Command, Hawaii
USATARCOM	US Army Tank-Automotive Readiness Command
USATB	US Army Training Board
USATCFE	US Army Transportation Center
USATSA	US Army Troop Support Agency
USATSC	US Army Training Support Center
USATSCH	US Army Transportation School
USMA	United States Military Academy
UTD	Unit Training Directorate

UTTAS	Utility Tactical Transport Aircraft System
UWAVM	Underwater Antivehicle Mine
VADS	VULCAN Air Defense System
VCSA	Vice Chief of Staff Army
VIC	Visibility of Intransit Cargo
WARPAC	Wartime Repair Part Consumption Planning Code
WESTPAC	Western Pacific
WSMR	White Sands Missile Range
WWMCCS	Worldwide Military Command and Control System
YPG	Yuma Proving Ground

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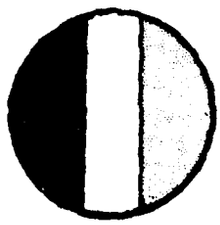

Duty Hours	0730-1630 Mon-Fri
After Duty Hours	
Contact Fort Lee Duty Officer	687-2[illegible]
Commercial	804-734-4307
Telephone Information	
AUTOVON	687-xxxx
Telecopier	687-2[illegible]
Dictating System	2[illegible]

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Secretary	Mrs. D. Tilmon	1866/3310	

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Mr. D. Tilmon	1723/2441
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[illegible]	1723/2441
[illegible] Burns	1723/2441
Mrs. S. Timperio	1723/2441

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Mr. [illegible] Reynolds	7443
Mr. [illegible] Audle	7641

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[illegible] Moore	1960/2666
Dr. [illegible] Pate, Jr.	1960/2666

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Dr. Robert Smith (Historian)	2632
Mrs. J. S. Weimer (Librarian)	4749
Mrs. C. Conrad (Secretary)	3456

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SGT B. Senski	3511
SP5 C. Troutman	3511
SP5 J. Robinson	3511

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SP4 L. Anderson	2525,2334
SP5 J. Sample	2525,2334
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Mrs. M. Lichtenberger	1342/2443

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MAJ F. R. Wright	4027/4181
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Mr. N. Q. Knarr	4027/4181
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MAJ W. J. Reuter	1945/3745
CPT D. M. Abrahamson	4027/4181
2LT B. G. Weidner	1945/3745
Mr. E. T. Walsh	1945/3745
Mr. G. W. Kronn	1945/3745

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Mrs. R. H. Varalla	2017/2118

Combat Zone Log Branch (ATCL-CTC)

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LTC R. E. Dodson	1945/4845
LTC H. C. James	2017/2874
LTC E. W. Kelly	3745/1945
MAJ R. W. Campbell	2336/3162
MAJ R. M. Ruthven	2017/2874
MAJ A. W. Wright	3745/1945
Mr. D. J. LeBlanc	2017/2874
Mr. J. R. Fitzjarrald	2017/2874
SFC J. E. Crews	2017/2874

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LTC N. R. Love	2118/1377
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CPT J. R. Hansen	2118/1377
Mr. G. W. Thorpe	2118/1377

2 1

ATES ARMY LOGISTICS CENTER

FORT LEE, VIRGINIA 23801
AND ORGANIZATION DIRECTORY

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Secretary	Mrs. Millie Gordon	1542	CIC 4
SM	CSM Angel L. Munoz	1358	CIC 32
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Secretary	Mrs. Millie Gordon	1540/4104	CIC 4

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Secretary	Mrs. Carolyn King	1683/1358	CIC 0

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Secretary	Mrs. Lee Killin	1310/1770	CIC 33
(ATCL-TEA)			
Technical Adv	Mr. Frederick H. Terry	1770/3163	CIC 27
Secretary	Mrs. Lee Killin	1770/3163	

CIC 29
CIC 33

CIC 27

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Secretary	Mrs P. L. Orth	3271/3413	

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MAJ F. F. Hindman	3413
Mrs. F. C. Edwards	3413
Mrs. E. M. Covington	3413/3271

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Mrs. B. I. Chaple	1114/ 347

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MAJ (P) J. B. Missal	2360/3659
Mr. H. E. Burnette	2360/3659

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TMDE Mgmt Div (ATCL-MT)

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Mrs. L. M. Kirkland	1834/1614

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MSG R. Hadley	1834/1614

Policy, Mgmt Branch

Mr. C. S. Ball	1834/1614

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Mrs. B. R. Meade	2448/3300

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LTC L. Askew	1114/3347

Mr. [illegible] F. Roussos 1960/2666
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Analysis Branch (ATCL-OPT)

Mrs. [illegible] P. Winfield
Pub & Printing Control Ofc (ATCL-OAT)

Trans/fac Branch (ATCL-CFT)

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MAJ [illegible] D. Allen	1342/2443
Mr. [illegible] W. McClure	1342/2443
Mr. [illegible] W. Osgood	1342/2443

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MSG W. E. Render	1615/3519
SGT H. H. Benton	1615/3519
Mr. G. R. Albert	1615/3519
Mr. P. E. Keithly	1615/3519
Mr. W. E. Kiss	1615/3519
Mrs. J. W. Burdette	3519/1615

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LTC C. A. Hawkins	2712/2284
MAJ A. W. Revelle	1186/1916
Mr. M. S. Abbott	3935/1186
Mr. H. A. Reichstetter	3935/1186
Mr. F. G. Wolf	1916/3935
Miss D. A. Shea	3935/1186
SGM J. E. Platt	2712/2284
SFC E. E. Williams	2712/2284
Mr. P. L. Lewis	2712/2284
Mrs. C. S. Anderson	3935/1186
Mrs. B. B. Moody	2712/2284

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(ATCL-FS) (Bldg P-1240)

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MAJ W. G. Morris	3336/1455
CPT J. R. Selman	3336/1455
SFC J. E. DeVan	3336/1455
Mr. D. J. Stewardson	3336/1455
Mr. R. W. Henry	3336/1455
Mrs. J. C. Gunn	1455/3336

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MAJ J. E. Carroll	[illegible]
CPT J. E. Draughon	[illegible]
Mr. E. L. Faulkner	[illegible]
Mr. M. E. Harvey	[illegible]
Mr. J. E. Wood	[illegible]
Mrs. M. F. Vaughan	[illegible]

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ARRCOM, Alex, VA (DRCSO-I)
[illegible] W. White, AV [illegible]

USA Ft. Leavenworth, KS (ATZL-CA-LOM)
MAJ [illegible] E. Markle, AV [illegible]

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LTC [illegible] Williams, [illegible]

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CPT [illegible] D. Fenton, 2764

TRADOC Liaison Office
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ATTN: COL Frank E. Varljen
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VACANT	
VACANT	
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VACANT	

Requirements Validation Team

MAJ H. K. Ebbitt	[illegible]
MAJ J. E. Carroll	[illegible]
MAJ R. M. Duggan	[illegible]
MAJ P. H. Johns	[illegible]
Mr. W. E. Kiss	[illegible]
Mr. O. Scott	[illegible]
CPT S. G. Young	[illegible]

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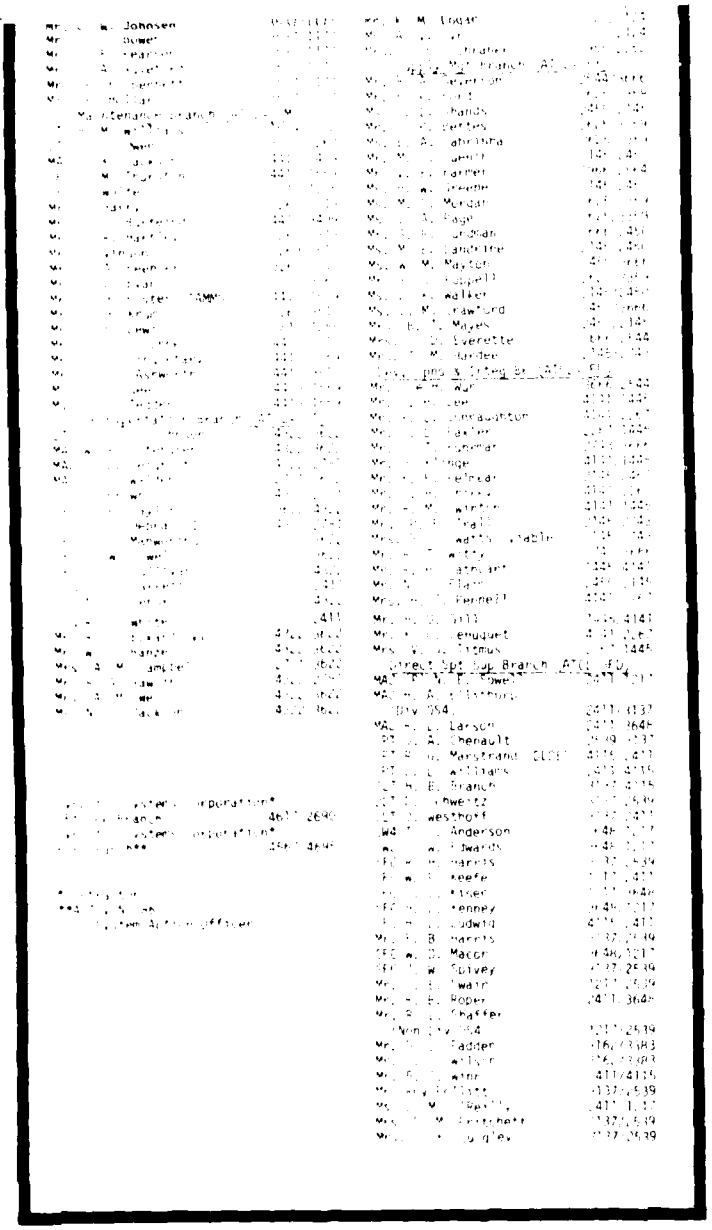

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SFC E. G. Ferrell	2037
Mr. R. W. Allen	2037
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SGM King	4067
Mr. E. T. Gable	4067
Mr. O. Scott	4067

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MAJ L. K. Flickinger	4067
MAJ J. E. McKnight	4067
1LT S. M. Clifford	4067
Ms. M. K. Curtis	4067
Mr. P. D. Greene	4067

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LTC P. H. Fournia	4766
MAJ R. L. Floyd	4552
MAJ J. A. Robertson	4641
MAJ L. F. Schucht	4641
Mrs. A. G. Neverson	4552
Mr. F. R. Vanderslice	4552
Mrs. B. J. Deffely	4552

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MAJ [illegible] K. E. Jamerson	2549/3532	
Mrs. [illegible] M. Tucker	2549/3532	

Combat Vehicles Branch

Mr. A. Pratt	2549/3532
MAJ N. J. Kirsch	2448
Mr. [illegible] M. Thompson	3532
[illegible] B. Riegsecker	3532
[illegible] R. W. Williams	3532
[illegible] Smith	2549
Mr. [illegible] Myers	2448

Ammunition & Missiles Branch

MA[illegible] W. J. Savoy	2549
MA[illegible] M. Duggan	2549
[illegible] K. Kim	3532
Mr. [illegible] P. Looney	2549

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Mrs. [illegible] A. Joyner	1614/1834

Communications Branch

PT [illegible] S. Young	1614/3392
[illegible]W4 [illegible] D. Graves	1614/3392
Mr. [illegible] L. Beall	1614/3392
Mr. [illegible] A. Lanier	1614/3392

Aviation Branch

MAJ T. J. Richardson	4723/1390
CW2 S. J. Shumaker	4723/1390
Mr. B. L. Morrison	4723/1390
Mr. W. G. Everhart	4723/1390

CPT R. P. Kelley	1114/3347	
Mr. A. W. Marshall	1114/3347	
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Tactical Mobility Branch

Mr. R. J. Kurtz	244[illegible] 3309
Mr. H. P. Cohen	244[illegible] 3309
Mr. R. K. Roe	244[illegible] 3309
2LT R. L. Baker	244[illegible] 3309
Mr. W. A. Garlow, Jr.	244[illegible] 3309

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Bldg P-2401

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Mrs. R. B. Figg	1368

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LTC R. G. Smith	4535
MAJ R. L. Atkins	4235
CPT F. E. Oglesby, Jr.	4535
CPT L. J. Marotti, Jr.	4235
MSG J. W. Corrigan	4443
Ms. B. L. Trefsgar	3938

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MAJ (P) C. L. Jackson II	1969
SFC G. R. Walters	2563

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LTC F. W. Horton	3750
MAJ T. P. Williams	2016
MAJ G. J. Collins	3268
CPT B. M. Chism	2064
CPT (P) G. P. Schierholz	1761
2LT C. H. Lee	2016
2LT H. M. Trent	3552
Mr. W. M. Andrews	1948
Mr. A. F. Chadwick	2064
Mrs. M. M. Courson	3750

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LTC R. C. Davis (NG Adv)	2710
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MSG W. S. Serio	4425
SFC W. R. Browne	4425
Mr. J. N. Harris	2309
Mr. R. R. Recher	2309

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MSG P. D. Perreault	3613
SP5 P. F. Desrosiers	3886

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MAJ P. A. Feddo (MP)	1969
SFC R. A. Drown (Trans)	3268
SSG P. E. Clifford (QM)	2016